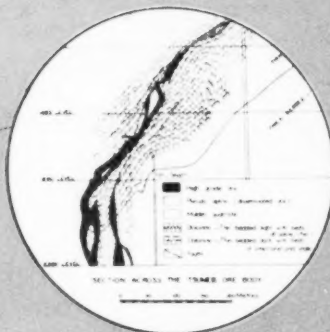


MINING WORLD



in this issue

The Tsumeb Story

Page 21

MAY, 1952

Vol. 14 No. 6

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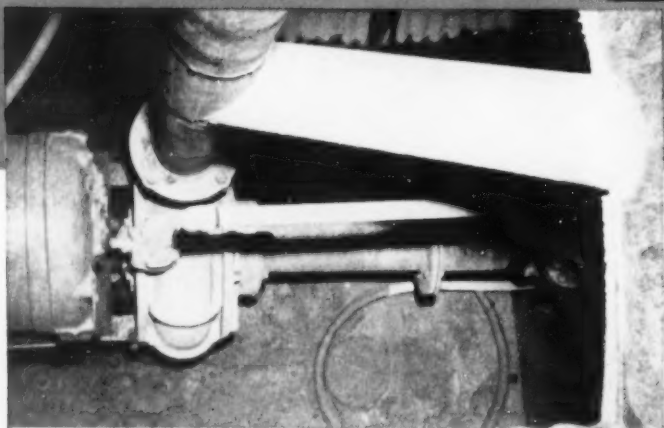
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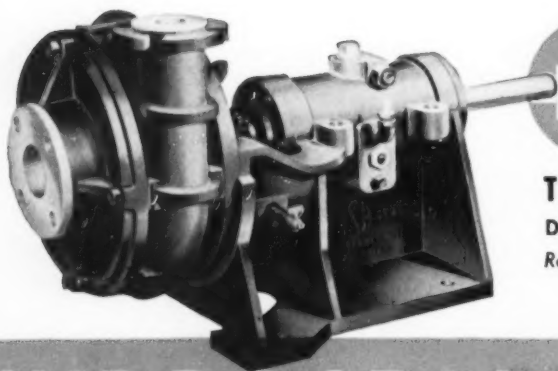


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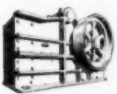
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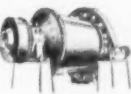
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Kilns, Coolers, Dryers

MAY, 1952

[World Mining Section—1]

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**Result:
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The Liddicoat bit is made with a round socket in which four flats are forged. The socket of the skirt has a slight taper but is malleable and conforms to the straight side of the rod. The bit fastens onto the rod with a drive fit as in contrast with the screw-on type of connection. Any turning of the rod within the bit socket tends to lock tightly the bit to the rod, yet it is easily removed with a weighted knockoff block.

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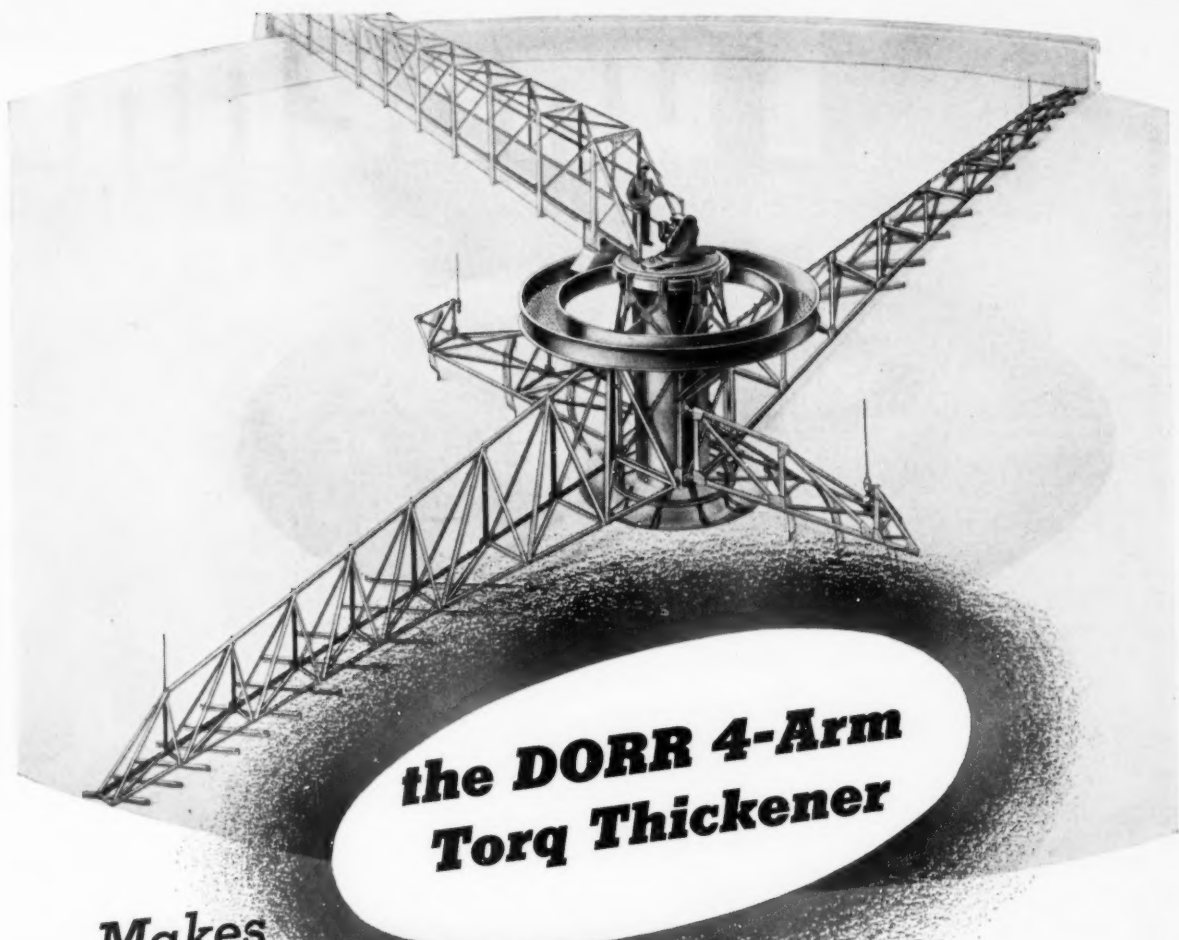
Liddicoat actually chips out the rock instead of battering it until it is pulverized, as is the case with conventional bits. This is the accomplishment of the two stage cutting action and the special wing design which retains sharp cutting portions for the life of the bit.

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For more information about the mechanical advantages of the 4-Arm Torq and the complete Dorr Thickener line, ask us to send you a copy of Bulletin No. 3001. THE DORR COMPANY, Barry Place, Stamford, Conn.

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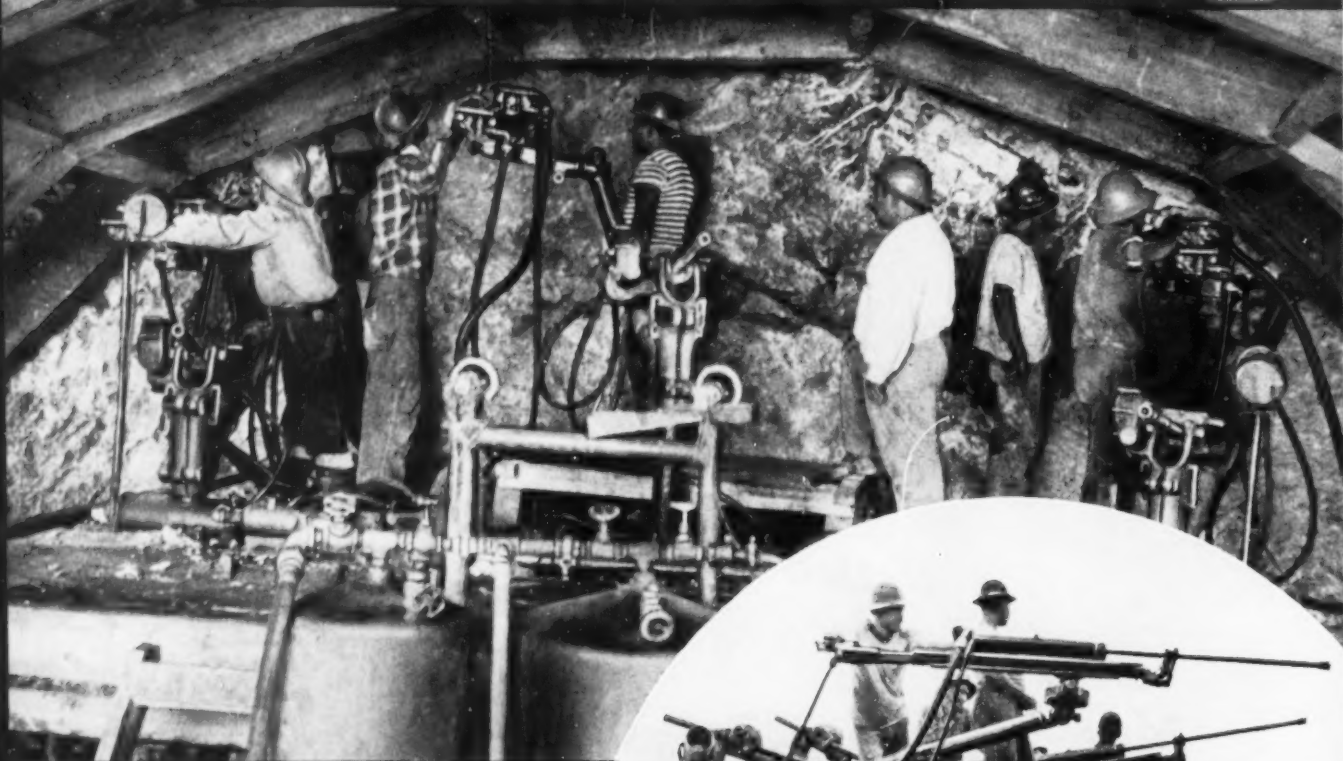
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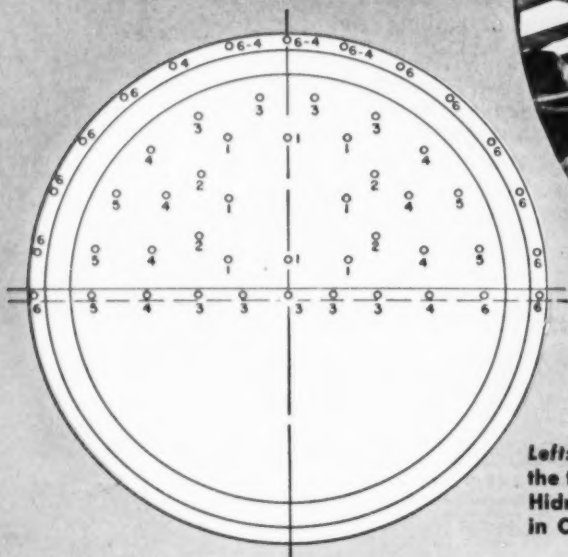
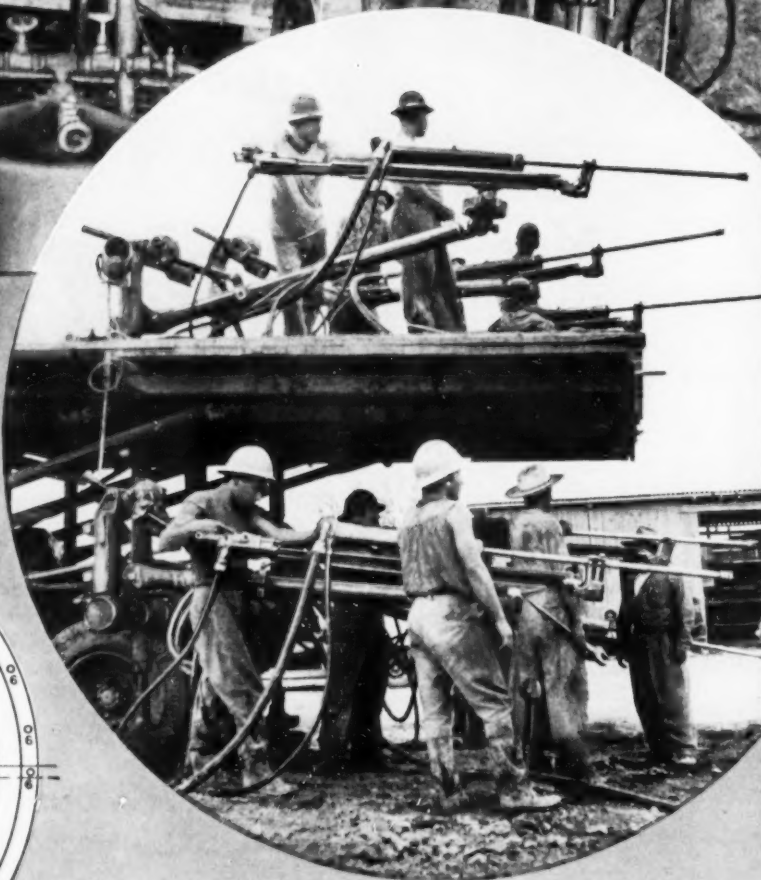
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Tunneling



Right: Six-drill jumbo with Le RO-CLEVELAND power feed drifters and air-motor booms on a 1½-ton truck. 1¼" round-lug steel and 2" carbide bits. Air supply — two 500 cfm compressors.



Left: Standard drill pattern for 50-hole round. Typical of the top-heading and bench method used by Construcciones Hidraulicas, S.A. in driving three 27'-bore circular tunnels in Obregon, Sonora, Mexico.

costs reduced!

with Le Roi-CLEVELAND Drifters and Jumbo Booms

**You spot your holes easier —
get less overbreak!**

**You get higher drilling speeds,
for faster cycles!**

Better fragmentation! More footage per shift! That's the pay-off, when you use Le Roi-CLEVELAND Jumbo Booms and power-feed Drifters in your rock headings. The pay-off that means lower costs on any rock-drilling or tunneling job.

- Le Roi-CLEVELAND Jumbos are versatile. Air-motor powered booms let you spot and space your holes quickly and easily for the most efficient fragmentation. Their greater flexibility lets you keep the tunnel bore close to pay line — with little overbreak or underbreak.

- Rigid, non-slip set-up feature of Le Roi-CLEVELAND Jumbo Booms keeps drifters in line, prevents steel binding, saves wear and tear on chucks.

- Strong rotation of Le Roi-CLEVELAND Drifters — plus snappy, powerful force of blow — give you unexcelled drilling speed. Graduated feed throttle lets you adjust pressure to get maximum footage in any type of rock formation. Fast feed travel makes steel-changing quick and easy.

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The seamy rock in one tunnel at Obregon required 9 sections of timber every 3'. To save time on timbering, the contractors used the Le Roi-CLEVELAND air-motor powered jumbo booms to raise the sections of timber from the top deck of the jumbo to the roof.



Tunnel No. 1 at Obregon is 2411' long; tunnel No. 2, 1378'; tunnel No. 3, 1850'. Tunnel bores were so regular one observer said they must have been cut with a knife.

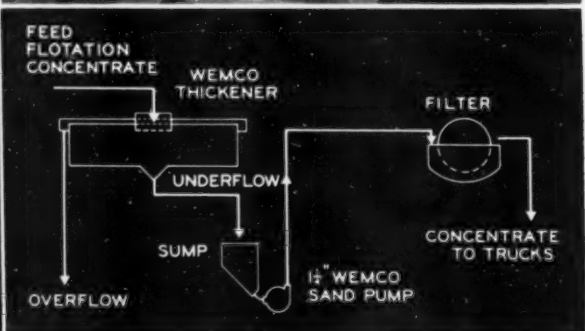
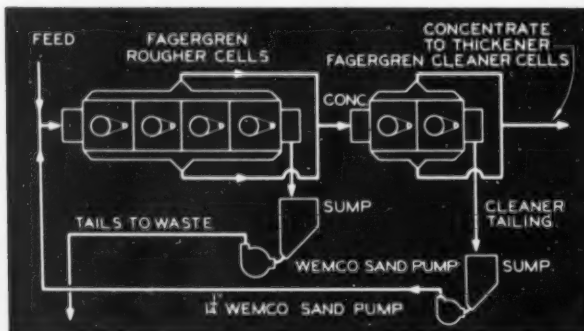
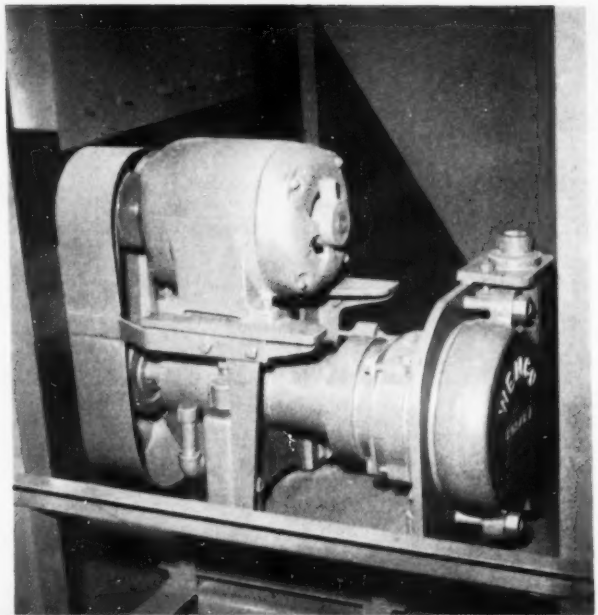
For small Pulp Volumes
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1¼" & 1½"

SAND PUMPS

compact—
light weight—
fits into small space—



The wide industry acceptance of WEMCO 1¼" & 1½" Sand Pumps proves the value of these outstanding design features:

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WEMCO 1¼" & 1½" Sand Pumps are designed for pulp flow rates up to 100 gpm. They exactly fit the requirements of small mills, pilot plants and split circuits in larger flow plans. For **reliable** service on small pump volumes, specify **WEMCO** and be sure!

SPECIFICATIONS

PUMP SIZE	INTAKE DIAMETER	DISCHARGE DIAMETER	STD. RUNNER DIAM.	MAX. PARTICLE SIZE	REQD. INTAKE HEAD	HORSEPOWER AND RPM AT VARIOUS DISCHARGE HEADS											
						HORSEPOWER AND RPM AT VARIOUS DISCHARGE HEADS											
						HORSEPOWER AND RPM AT VARIOUS DISCHARGE HEADS											
						20'					30'						
						BPM		HP		BPM		HP		BPM		HP	
1¼"	2½"	1½"	9"	¼"	2'-4"	20		30		40		50		60			
						BPM	HP	BPM	HP	BPM	HP	BPM	HP	BPM	HP		
						1055	7	1280	1.4	1475	1.9	1650	2.6				
						40		80		120		160		200			
						BPM	HP	BPM	HP	BPM	HP	BPM	HP	BPM	HP		
						1080	8	1300	1.7	1495	2.0	1665	2.7				
						60		120		180		240		300			
						BPM	HP	BPM	HP	BPM	HP	BPM	HP	BPM	HP		
						1115	1.0	1330	2.0	1520	2.2	1690	2.8				
1½"	2½"	1½"	9"	¼"	2'-4"	80		160		240		320		400			
						BPM	HP	BPM	HP	BPM	HP	BPM	HP	BPM	HP		
						1090	1.4	1300	2.1	1500	3.3	1675	4.8	1825	6.2		
						100		200		300		400		500			
						BPM	HP	BPM	HP	BPM	HP	BPM	HP	BPM	HP		
						1120	1.6	1320	2.3	1520	3.4	1690	5.0	1840	6.4		

Write today for descriptive bulletin No. P-15-1-1.

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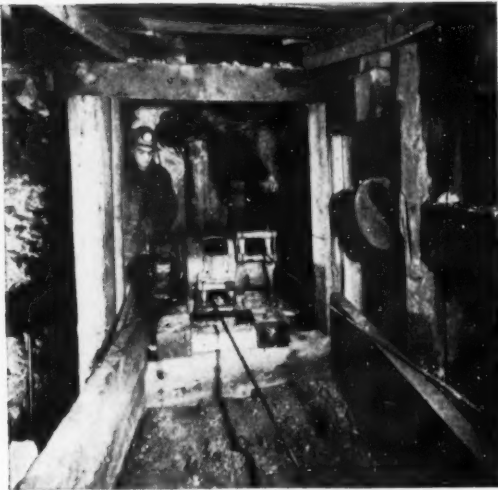
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AIR SLUSHER



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High speed—for more trips per shift.

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Write today for Bulletin AS-3 on Gardner-Denver Airslushers and Air Hoists.

SINCE 1859

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P&H MAGNETORQUE* is the electric swing that never wears out

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Miners Coal Company reports that

Thinner belt reinforced with "Cordura" rayon trains better, loaded or empty

This 36" slope belt trains perfectly even when empty, according to Kenneth Snarr, Manager of Miners Coal Company, Madisonville, Ky. It was manufactured by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., on a carcass made of Du Pont Cordura* High Tenacity Rayon.

The reason belts reinforced with "Cordura" train better is simple. "Cordura" rayon yarn is so much stronger than natural fiber yarns it permits a thinner belt with fewer plies. *Greater strength with less bulk.* These thin belts are naturally more flexible. So they train better. And the low stretch of "Cordura" yarn saves expensive shutdowns for take-up and resplicing.

Inquire about the advantages of belts reinforced with "Cordura" High Tenacity Rayon before you order your next conveyor belt. We'll be glad to send you the names of suppliers . . . also complete information about "Cordura" rayon. Just send for the *free* booklet, "Sinews for Industry." Address: Textile Fibers Department, Room 4421, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

* REG. U.S. PAT. OFF.

Du Pont *"Cordura"* High Tenacity Rayon
STRENGTH AT LOW COST



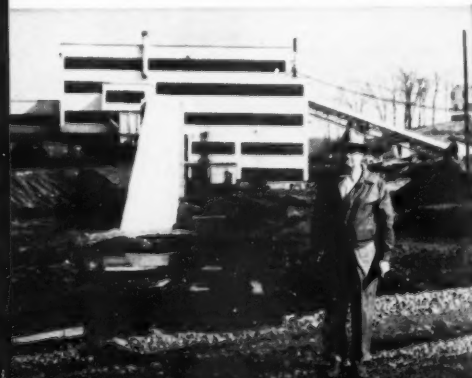
150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

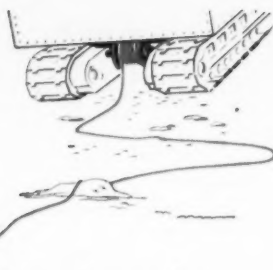


Reinforced with Du Pont "Cordura," this belt (above) operates at 383 feet per minute up a 17-degree slope, delivering 525 tons of coal per hour. During its operation, it has never been necessary to stop it for attention or repairs; and the belt has not stretched enough to be noticeable.

The slope belt lifts the coal 281 feet vertically to the large, modern tippie of the Miners Coal Company. It is 948 feet between centers. In foreground is Manager Kenneth Snarr.



proved in **our** mines
for better performance in **yours**

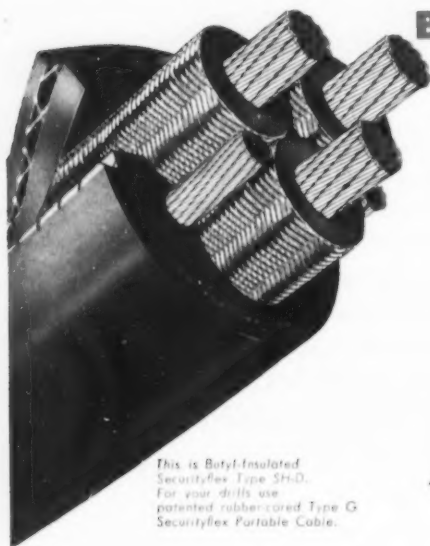


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COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other ANACONDA portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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MINING WORLD

MINING WORLD

and the export edition
WORLD MINING

A Miller Freeman Publication

Published monthly except in April when publication is semi-monthly

MAY, 1952

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DRIFTS AND CROSSCUTS Rights and Responsibilities

(Continued from the March issue.)

In our previous column, it was noted that some of the youthful agitators in the heyday of the I.W.W. have become the labor leaders of today. They have followed the Biblical admonition, "be ye therefore wise as serpents," but they certainly are not "harmless as doves." Formerly, on every street corner and from every soapbox we heard the I.W.W. rallying call, "Contracts! What are contracts? We will strike, and strike till no firm and no individual can afford to own an industry!" These older leaders are more cunning today. The slogan has gone underground, but one day's listening on the radio confirms how literally and faithfully they are still following that I.W.W. doctrine. (After lifelong efforts in favor of unionism we are sorry to have to say this.)

In the last 10 years all industries have mechanized. The production of most of them has doubled in size and doubled again, but mineral production has barely held its own or has fallen sadly behind. Take coal as a sample. John L. Lewis worked as a mucker in the copper mines at Bisbee, Arizona, during the most rampant days of the I.W.W. His bias of that day has continued to the present. By his tactics as national leader of the coal mine union he has forced the price of coal so high that he has priced himself out of the market.

We oldsters have happy memories of another leader. We turn gladly to memories of the more peaceful successful years with John Mitchell. One may well question the wisdom of a strike policy where a miner must work a year, two years, or even longer, before the pay increase gained will recover the total wages lost during the strike. Is that gain or progress?

In one of his holidays in the district of his earlier activities, Lewis gave an interview that was published in the *Tucson Daily Star* of April 21, 1948. With his usual shiftiness, he shied away from the word "communism." However, he did say—"but I do know that some peoples have found they could live happily, successfully, in a communal form in which the whole, and not a few, were given consideration." He did not mention the amount of personal liberty remaining to those living in a police-state. The measure of personal liberty is in the minds of many miners who have to work under the heavy hands of a labor czar and "The Boys."

We have written the above in such detail because that strike policy has set the pattern for the metal mine unions which have a known Communist slant.

At the moment that this is being written the radio states a meeting of the policy committee of the Mine, Mill & Smelter Union has been called in order to consider demands that will be made on our industry. A dozen other unions are also threatening to strike. This burst of activity is caused by Washington's mishandling of the steel matter. The Government insists on all its rights but shows no signs of assuming its responsibilities to stop the inflation spiral.

The Wanderer

COVER CIRCLE: The Tsumeb ore body attains its maximum size on the 2,390-foot level where it is elliptical in plan, 600 feet in length and 250 feet in greatest width.

only Allis-Chalmers offers you

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Thousands of Allis-Chalmers HD-5G 1-yd. front-end shovels are making history . . . handling an endless variety of excavating and material handling jobs faster, at lower cost than ever before.

Now . . . to meet the challenge of ever-increasing production demands, Allis-Chalmers *multiplies the scope of tractor usefulness even more*. And here's how.

The same basic design — the same versatility that made the HD-5G so useful can now be yours in 2-yd., 3-yd., and 4-yd. Tracto-Shovels. Combined with the unmatched performance of the new Allis-Chalmers tractors, they give you a real competitive advantage by bringing you a new, faster and better way of getting the job done.

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14 different attachments

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Dumping height (bucket hinge pin): 9 ft., 1/4 in.
Total weight: 16,200 lb.

2 yd. HD-9G

72 Drawbar hp.
Dumping height (bucket hinge pin): 11 ft., 4 in.
Total weight: 29,900 lb.

3 yd. HD-15G

109 Drawbar hp.
Dumping height (bucket hinge pin): 12 ft., 2 in.
Total weight: 40,000 lb.

4 yd. HD-20G

Hydraulic torque converter drive
175 net engine hp.
Dumping height (bucket hinge pin): 13 ft., 5 in.
Total weight: 61,600 lb.

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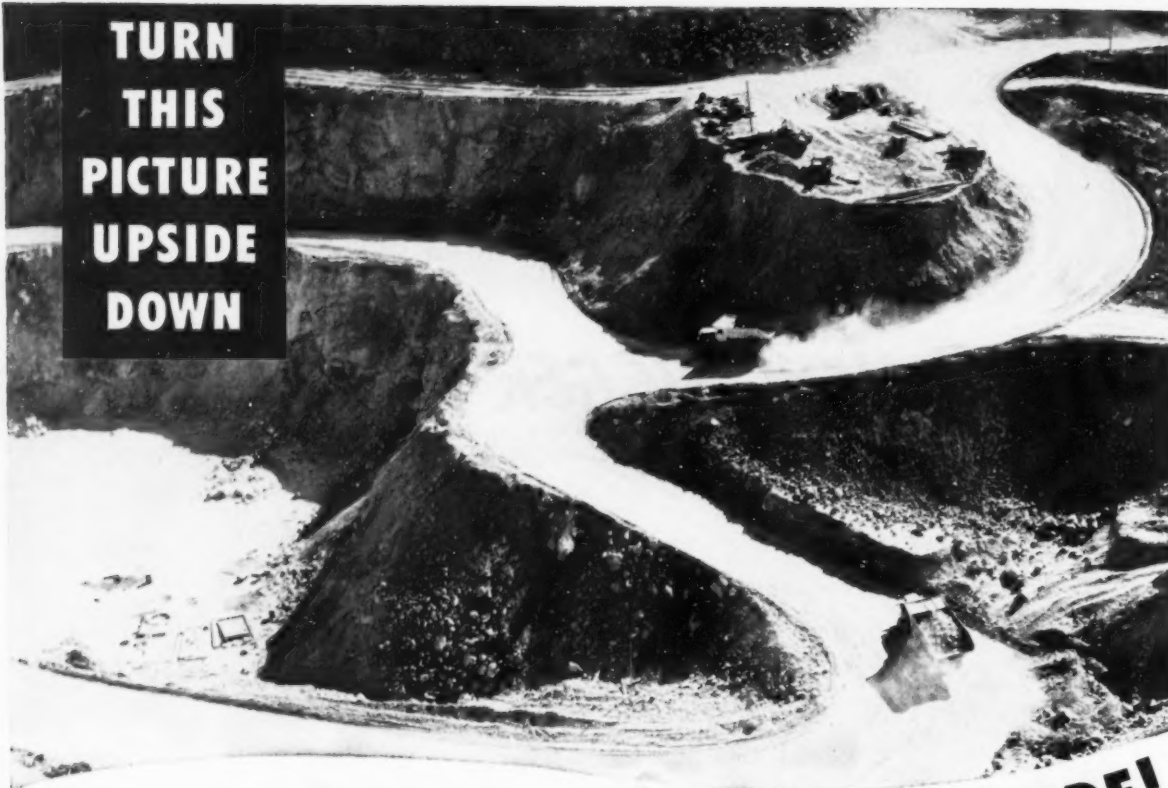
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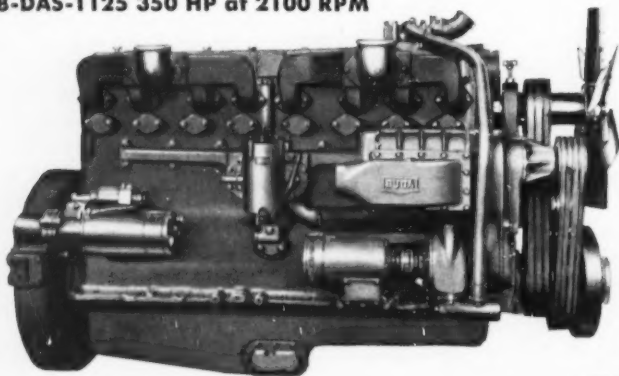
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CAPITOL CONCENTRATES

AMENDMENT INTRODUCED FOR OVER-MARKET METAL PAYMENTS

Senators Carl Hayden and Ernest McFarland of Arizona, James E. Murray of Montana, and Warren G. Magnusen of Washington are sponsoring an amendment to S. 2645, the extension of the Defense Production Act, which would specifically authorize the government to make over-ceiling or over-market contracts where it is necessary in the interest of the national defense to procure strategic or critical minerals from existing or new high-cost sources.

The present language of the act is somewhat cloudy and although the defense agencies in some instances have exercised this authority, their actions might in the future be questioned. It is felt that if the authority were clearly and specifically defined, there would be more action in that direction and a corresponding increase in production from new sources.

● **Words Versus Actions**

In view of the controversy in Washington regarding wages for steel workers, the attitude of the Wage Stabilization Board in authorizing further increases, the resignation of Charles E. Wilson because he could not get the backing from above to "hold the line," etc., we cannot help but recall a statement made by President Truman on September 9, 1950—60 days after Korea—in which he said:

"For wage earners the guiding principle must be: Do not ask for wage increases beyond what is needed to meet the rise in the cost-of-living. Our defense effort means that there will be an increasing number of jobs. If wage earners on that account ask for higher and higher wages, they will be driving prices up, all along the line. For the time being, therefore, wage increases should not be sought beyond what is necessary to keep wages in line with the cost-of-living."

It would appear that the President did not even convince himself. The idea was all right, but events have indicated that political pressure is far more important than idealism.

"Round and round we go and where we stop nobody knows."

● **Tri-State Miners Are Under Fire**

As if the mining people did not have enough trouble, OPS snoopers have been sneaking around in the Tri-State area investigating the zinc producers for alleged violations of the General Price Order, claiming too much money has been paid for concentrates. As the price of concentrates ultimately is controlled by the ceiling price of zinc, the whole business manifestly is absurd. Nevertheless, it is understood that suits may be filed for multiple damages against nearly every operator in the district. All this, of course, is well calculated to increase the production of scarce zinc! Phooey!

● **House Passes Mining Claim Measure**

The House of Representatives has passed a bill which would open to mineral development some 7,000,000 acres of western lands. The bill, introduced by Representative

Clair Engle, California, would allow mineral claims to be filed on lands withdrawn by government agencies in the past for potential use as power reservoir sites.

Engle declared that there has been wholesale withdrawals of land for power purposes, during the last 40 years, but that only a small percentage of such land is suitable or may be used eventually for power development. The bill, he added, protects the government by relieving it of liability for any mining claims or developments flooded by future construction of reservoirs.

● **Chilean Copper Negotiations Worry OPS**

The OPS is greatly worried at the trend of the Chilean copper negotiations which may, with additional taxes, result in a price as high as 33 cents per pound. To ask industry to swallow a two-price system varying by 3.0 cents was bad enough, although most fabricators took it in their stride and seemed to be able to absorb it without increasing the price of brass-mill products. A differential of 8.5 cents would be another matter and, no doubt, would disturb the price structures throughout and bring a flood of demands for amending the pricing orders and for equalizing the foreign and domestic quotations. In any case, what the State Department determines will be forced on OPS.

● **Consulting Service Is Inadequate**

What may seem to be a time and money saver often turns out to be neither. For example, it appeared quite logical to use the U. S. Bureau of Mines and the United States Geological Survey to service DMPA and DMEA, even to the point of using their routing systems and offices as well as their personnel. The results are far from expectations.

The normal functions of both bureaus are said to have been disrupted and the consulting services rendered seem to be both slow and inadequate for the type of work involved. Making examinations for the purpose of writing a brochure at some future indefinite period, and producing a quick, practical, business-like report slanted with an eye to defense policies are two vastly different things.

Many believe that the public interest would be better served were the bureau and survey returned to their more academic tasks and DMPA and DMEA serviced by their own engineering staffs over which they would have direct and immediate control—as the mining section of the Reconstruction Finance Corporation and WPB once had.

● **No Allocations For Stockpiling**

Last month the International Materials Conference, which recommends allocations of world supplies of raw materials, made an interesting comment on the position of metals. It remarked:

"As in the first quarter (1952), no allocation has been recommended for strategic stockpiling either of copper or of zinc, without prejudice to the principle of making such provision in future distributions. In order to conserve supplies of copper and zinc available to the Free World, the committee recommends that all countries do their utmost to eliminate nonessential consumption and to encourage substitution by materials not in short supply."

Helpful Technical Bulletins for Mill Men



From time to time when new Cyanamid Reagents are developed, when new applications for older reagents are made, and when data accumulates on separation processes for mineral dressing and coal preparation, Cyanamid's Mineral Dressing Laboratory publishes "Mineral Dressing Notes." Issues available include:

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- # 9 —New Depressants for Carbonaceous Gangue in Flotation Pulp
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- # 15 —Flotation Reagents
- # 16D—Dutch State Mines Cyclone Separator Processes
- # 17 —Chemistry of Cyanidation
- # 18 —Coal Preparation

On request, any or all of the foregoing issues will be sent to you. And, if you wish, your name will be placed on our list to receive future issues of *Mineral Dressing Notes* without cost.



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This is a fascinating statement in view of the articles in the press to the effect that there is no real copper shortage which could not be cured by taking off controls, and the apparent feeling in DPA and DMPA that there is no great pressure to increase domestic zinc production.

● **Interpreters Needed in Washington**

While speaking on a current phase of the materials allotment program, a controls official is reported to have made the following statement:

"We are peaking our program philosophically, but it is naive to assume the allotment program is an equity program unless the allotments are so abysmally low that they permit the agency to relax and allow market determination as a percentage of base period, sidetracking military return with adjustments. This is based on use levels proportionately and is in the market test sense. We now have a quantitative framework with marginal qualitative reallocations to formalize the procedure for the further refining and implementing of our objectives."

If you can figure out what this says, and put it in the English language, maybe you can get a job as an interpreter!

● **Choice of Word Should be Noted**

According to a report of the International Materials Conference, "copper supplies are still inadequate," but "the availabilities of zinc, however, are shown to be improving." Note that the report does not say zinc production is improving, but that more metal is "available," which may be due to a number of economic factors which could change over night.

● **Tungsten Shortage Continues**

World production of tungsten has increased about 80 percent in the last year, but the metal still is in critically short supply.

● **Reasons Given For Easier Metal Supply**

As foreign exchange and dollar availability are affecting the metal-supply situation by throwing more metal our way and reducing foreign prices, so is the lag in the defense program having a similar effect. Actually, the military orders have not progressed as rapidly as was planned and the manufacturers of military equipment, therefore, are not absorbing as much metal. This is permitting more to be channeled into civilian uses. It seems pretty sure that as the defense program reaches a peak, shortages again will appear. Therefore, the mining industry hopes that government planners will see this situation clearly and will not relax their efforts for the procurement of defense minerals.

COMING CONVENTIONS

May 8 to 10, 1952. PACIFIC NORTHWEST CONFERENCE OF METALS AND MINERALS, Columbia Section, AIME, Davenport Hotel, Spokane, Washington.

September 8 through 15, 1952. XIX Session INTERNATIONAL GEOLOGIC CONGRESS, Algiers, Algeria.

November 6 through 8, 1952. Joint convention of the NEW MEXICO MINING ASSOCIATION and the INTERNATIONAL MINING DAYS, Alvarado Hotel, Albuquerque, New Mexico.



INTERNATIONAL PANORAMA



BISBEE—Copper production in 1951—250,692 tons—by the Phelps Dodge Corporation was the largest in any year. The 1950 output of the Corporation's Arizona mines was 244,876 tons.

SPOKANE—The American Smelting and Refining Company has signed a contract with the Defense Materials Procurement Agency for the sale of up to 18,500 tons of slab zinc from the new Van Stone mine. DMPA floor price for the zinc will be 15½ cents per pound, East St. Louis, but the company has the right to sell to other buyers for a higher price.

WASHINGTON—Four special committees have been established in the United States House of Representatives to study the legality and effects on United States industry of the International Materials Conference.

TOKYO—The Japanese Iron and Steel Bureau of the Ministry of International Trade and Industry plans to import 2,450,000 metric tons of iron ore from the United States in 1952. Other ore will be imported from the Philippines, Hong Kong, and Malaya.

CARACAS—High-grade iron ore deposits have been discovered at El Valle five miles east of here and in central Venezuela at Valencia, Carabobo state.

WASHINGTON—The Copper Range Company has signed a contract with the Defense Materials Procurement Agency for sale of up to 6,372,000 pounds of copper at 33.8 cents per pound from its Champion mine in northern Michigan.

MARYSVILLE, UTAH—The Vanadium Corporation of America has optioned a mill site here. Development of its uranium mines is proving satisfactory ore reserves; some with high-grade pitchblende.

VANCOUVER—Macro (Exploration Division of Kennametal Inc.) will build a tungsten concentrating mill and electric smelting plant to produce tungsten carbide at Port Coquitlam.

BURKE, IDAHO—The Sullivan Mining Company is driving an 8,500-foot-long, mill-level, haulage adit at its Star mine. The adit is scheduled for completion by the end of the year and will reduce mining costs.

LORDSBURG, NEW MEXICO—The Banner Mining Company has signed an over-the-ceiling copper contract with the DMPA for producing 5,438,000 pounds of copper in the next two years from its Miser's Chest mine. The price is 30.53 cents per pound. The contract terminates immediately if price ceilings are removed.

LA PAZ—The Bolivian Banco Minero is planning an extensive drilling campaign to determine manganese ore reserves on its concessions near Corumbá.

MONTREAL—Noranda Mines, Ltd. has developed an additional 8,025,000 tons of low-grade copper ore at its Gaspé copper property. Total reserves are estimated at 65,000,000 tons.

BATESVILLE, ARKANSAS—The Westmoreland Manganese Corporation will build a 6,000 long-ton daily-capacity, manganese washing plant here under a contract with the DMPA. Cost is estimated at \$3,607,250 with first production scheduled for early 1953.

TORONTO—The Jalore Mining Company, Ltd. has acquired exploration options on four areas in southeastern Ontario. The firm will prospect drill the areas for iron ore this year.

SAO PAULO—The Rio Doce Valley Company has scheduled exports of 1,500,000 tons of high-grade iron ore in 1952.

WASHINGTON—The United States government has resumed purchases of lead for the national stockpile. Deliveries are to be made during the first half of 1952 at a price of 19 cents per pound.

ROME—Production of aluminum in Italy in 1951 was an all-time high—49,344 tons. The previous high was in 1950 at 49,135 tons.

PAINESDALE, MICHIGAN—The White Pine Copper Company has awarded a contract to the Turner Construction Company for underground development, a 10,500-ton-per-day flotation mill, a smelter, and a townsite at its White Pine copper mine.

SALT LAKE CITY—Production of molybdenite by Kennecott Copper Corporation in 1951 established an all-time record; 30,837,157 pounds.

WASHINGTON—The Reconstruction Finance Corporation has signed a contract to buy 18,000 tons of tin annually for the next three years from the Indonesian government. The price for the first two years is to be \$1.18 per pound.

KILEMBE, UGANDA—Kilembe Mines Limited will build its new flotation mill near its ore deposits here instead of at Jinja.

ATHENS—Eleusis Bauxite Mines Company has received \$120,000 and other aid from the United States' MSA to buy mining equipment to increase bauxite production to 350,000 annual tons by 1955. The ore will be shipped to two German companies to be processed into aluminum metal.

SANTIAGO, CHILE—The Compania Minera Rio Blanco, Ltda. is reported to have developed 27,800,000 short tons of 2.2 percent copper ore at its mines. Plans for mining the ore are underway.

KNOXVILLE, TENNESSEE—The Electro Manganese Corporation will build a new plant to double its production of electrolytic manganese to 14,400,000 annual pounds in 1954. DMPA will advance \$2,250,000 for construction and will buy up to 36,000,000 pounds of the metal if no regular market sales can be made.

BRUSSELS—Tin producers in the Belgian Congo and Ruanada Urundi will sell the Reconstruction Finance Corporation 7,000 to 9,000 tons of tin per year for a two-year period at a base price of \$1.2075 per pound delivered at United States ports.

RAY, ARIZONA—An all-time record production of ore was made in 1951 by the Ray Mines Division, Kennecott Copper Corporation when production was 4,213,154 tons.

Huge Loan to Arkansas Firm for Manganese

Nearly \$4,000,000 has been advanced to an Arkansas firm by the Defense Materials Procurement Agency to boost production of manganese in the United States.

The loan of \$3,807,250 was advanced to the Westmoreland Manganese Corporation of Batesville, Arkansas, to build a washing mill and to acquire land and additional equipment. The company's property is at Cushman, Arkansas, where production is expected to begin within eight months. Full capacity operations are expected within a year. The mill will have a daily capacity of 6,000 long tons.

DMPA expects to boost U.S. production of manganese by 52,800 long tons annually. Total U.S. output for 1951 was 1,700,000 long tons. The contract will expire when the company delivers a total of 261,000 long tons, or six years after start of production, or by June 30, 1959—whichever occurs first.

DMPA will pay between \$1.67 and \$1.72 for each 20-pound unit of manganese produced by the company in the first four months after full production begins. The price will then decrease to between \$1.37 and \$1.42 for the next six months. Other price adjustments will continue to take place after that time.

Australian Uranium Ore Air-Shipped to U. S. A.

A metallurgical test sample of uranium ore weighing 250 pounds has been flown from Adelaide, New South Wales, Australia to Watertown, New York. The ore was mined at the Mt. Painter deposits by the Australian government.

Belgian Congo and RFC Agree on Tin Price

Belgian Congo tin producers have agreed to sell tin to the United States' Reconstruction Finance Corporation at \$1.20½ per pound delivered at American ports. If a more favorable price is granted to other suppliers, such as Malaya, Bolivia, or Indonesia, the price will automatically increase.

Covering a two-year period, the contract is renewable from year to year. A minimum of 7,000 tons and a maximum of 9,000 tons will be delivered to the RFC with part of the deliveries in tin concentrates. This is more than half of the Belgian Congo's annual output.

The price agreed upon is lower than that being paid for Congo tin outside of the United States, but producers accepted the terms because they wanted to obtain a guaranteed price for 50 percent of their output, and they also wished to raise the level of the Belgian Congo's dollar export volume. The new contract assures the Congo of receipts amounting to at least \$36,000,000.



The new 100-ton-per-day sulphur flotation mill of the Wyoming-Gulf Sulphur Corporation was built in six months and has been in successful operation since November.

NATION'S NEWEST SULPHUR PRODUCER

Wyoming-Gulf Sulphur Corporation developed substantial ore reserves, designed and built a 100-ton flotation mill in less than one year's time

Development of surface deposits of sulphur were neglected for many years because it was easier to produce high-grade sulphur from the Gulf Coast domes. Increasing world demands skyrocketed following the start of the Korean War, so large

concerns started the search for additional sources of sulphur. One of the first deposits to be checked was near Cody, Wyoming, and preliminary investigations proved so promising that the Wyoming-Gulf Sulphur Corporation was formed with

H. W. Marquette of Dallas, Texas, as president and general manager.

In December 1950, the firm secured leases on 1,750 acres of sulphur-bearing land around the base of Cedar Mountain, three miles west of Cody. On January 1, 1951, the corporation started an extensive diamond drilling program to explore the area. So successful was the drilling that in two months time, on only 20 percent of the area, a large tonnage of sulphur ore had been developed.

Geology of the deposit

Initially, the geology of the Cedar Mountain area posed difficult problems of interpretation. All deposits are covered with overburden or have a capping of travertine. Some deposits are geyser cones capped with geyselite. Initial drilling was done in those areas where sulphur-bearing material had been exposed by erosion. Interpretation and analysis of drill cores and cuttings yielded basic information from which it was possible to determine a geologic pattern to guide further drilling.

Sulphur is found in a series of

One-half inch oversize from this vibrating screen is reduced in a set of 20-inch rolls.



domes. Some domes overlap and others are individual cones close to each other.

At least two theories have been advanced about the possible origin of the deposits. The first is that hydrogen sulphide was contained in super-saturated solutions of hot water that reached the surface. At or near the surface the pressure and temperature decreased to a point where the sulphur precipitated and was deposited around a silicious gangue. Thicknesses as great as 130 feet were thus formed. To date no amorphous sulphur has been found; however, by microscopic study, many forms of crystallization have been identified.

The second theory is that the action of hot water algae broke down gypsum and formed calcium carbonate and sulphur.

Open pit mining

Mining was started about 800 feet from the mill. The clay overburden in the area, 14 feet thick at a maximum, is bulldozed away. The ore is drilled with jackhammers, the holes are loaded and blasted, and the broken ore is loaded into trucks by a power shovel.

Metallurgical Testing

When a large tonnage of ore was assured by drilling, the corporation made plans for building a mill. First the flowsheet was carefully worked out by batch laboratory testing of the ore, followed by a full-scale pilot plant test in Denver, Colorado. Results of the tests indicated that it was economically practical to make



Sulphur is floated in eight No. 18 "Sub-A" cells at the Cody, Wyoming, plant of the Wyoming-Gulf Sulphur Corporation. The light-colored froth is quite different than that which western metal producers are used to.

a high-grade flotation concentrate and a contract was awarded to the O. W. Walvoord Company of Denver for mill design and construction.

The 100-ton-per-day mill was designed so that only three men per shift are necessary from crusher to storage vat. Fluorescent lighting is used in the ball mill and flotation sections of the windowless mill building. Interlocking electrical controls and switches permit central

control of the entire plant from panel boards. At three separate points, pushing of one button will stop the entire plant in the event of trouble.

The mill site was picked on a gentle hill slope in the approximate center of the developed sulphur deposits, none of which are more than two miles away. A stream of water, high tension power lines, and two state highways cross the property

Overburden has been stripped away, exposing the dome-shaped sulphur orebody. The overburden is largely travertine.





LEFT: The discharge end of the Marcy ball mill is equipped with a stainless steel trommel screen. Oversize is too low in sulphur to be reground and is trammed to the waste dump in the mine car. The pulp (undersize) flows to flotation cells. RIGHT: The 10 by 20 inch jaw crusher in the foreground reduces the sulphur ore to one inch size.

near the mill site. Ground was broken for the mill on April 28, 1951 and operations began November 7.

The Crushing Plant

Loaded trucks dump onto a steel rail grizzly, set at six inches, on top of the 150-ton coarse ore bin. Oversize is sledged through the grizzly. The coarse ore is drawn from the bottom of the bin by an oscillating feeder which discharges onto a sloping, hard-surfaced, bar grizzly with one inch openings. Oversize drops directly into a 10- by 20-inch jaw crusher set at one inch. Crusher discharge falls to a 16-inch conveyor belt on which the grizzly undersize also drops. The crushed ore is elevated by the conveyor belt to the top of a 3- by 6-foot, inclined, single-deck vibrating screen

equipped with ½-inch square-opening screen cloth. The minus-½-inch screen undersize is conveyed to the top of a 120-ton cylindrical fine ore bin. The screen oversize is conveyed to a set of 20-inch rolls. The roll undersize is fed to the jaw crusher undersize conveyor belt to close the circuit with the vibrating screen.

A magnetic head pulley, on the oversize belt, prevents tramp iron from getting into the rolls. A dual dust collecting system is installed to eliminate dust. One man operates the crushing and screening plant.

Coarse Abrasive Grind

Fine ore is drawn from any one of three openings in the bottom of the fine ore bin by a 20-inch adjustable belt feeder. The 6- by 4-foot ball mill

uses porcelain grinding balls to polish and break up the ore. Fine grinding is not necessary because the sulphur occurs only in the fractures and cleavages of the mineralized formation. The sulphur particles are simply freed from the gangue rather than being finely ground.

No Classifier in Circuit

Ball mill overflow goes into a trommel screen attached to the mill trunnion. The first section of the screen is ½-inch to scalp off the large particles ahead of the 20-mesh stainless steel screen. Screen oversize drops into a one-ton mine car. The oversize is too low in sulphur content to warrant regrinding in the ball mill so it is trammed from the mill and dumped. The pulp (screen undersize) flows to a bank of eight No. 18 "Sub-A" flotation cells. Four rougher cells produce a 70 percent sulphur concentrate which is cleaned and recleaned to 90 percent. The concentrate is pumped to a 25-foot thickener, and the under-flow is dewatered on a six-foot disc filter. The filter cake drops to a conveyor belt and is carried to the melting pans. The pans are heated by steam supplied by 125-hp. boilers. Molten sulphur flows from the pans to wood vats approximately 50 feet square in which the sulphur solidifies. After solidification, the sides of the vat are removed and the block of sulphur is drilled and blasted with dynamite to facilitate loading and shipment.

Plant operations have proven so successful that plans have been made to double the capacity in the first part of 1952.

This section of one of the dome-shaped orebodies looks like a porcupine. However, the plugs, not quills, keep the jackhammer holes from being filled up.



THE TSUMEB STORY - -

PROGRESSIVE POLICY FOR MINE AND COMMUNITY

By John Metz

In 1950 Fortune Magazine called Tsumeb "a beat-up mine in South West Africa." The report of operations (see box) for the fiscal years ended June 30, 1950 and June 30, 1951, together with the six months ended December 31, 1951, prove that in two years it has become one of the world's greatest mines.

This is the first of two articles written by the staff of the Tsumeb Corporation Limited telling how and why the mine has become world famous. The second article will appear in June and will cover the mechanical-electric operations and the Tsumeb differential flotation mill—Ed.

The Tsumeb Corporation's property is near the northern boundary of South West Africa, centrally situated in the northern section of the Otavi Mountains at latitude 19° 15' south and longitude 17° 42' east.

History

The spectacular mineral outcrops at Tsumeb were known to the natives of the region for many generations. The copper ore was either smelted locally by the natives or taken for treatment to Ondongua (in Ovamboland) where the metal was used to make weapons, trinkets and household utensils.

In 1900, the mineral rights of Tsumeb were purchased by the Otavi Minen und Eisenbahn Gesellschaft (O.M.E.G.) which company was



M. D. Banghart
General Manager

John Metz
Assistant General Manager

Jack B. Ward
Resident Manager

financed by German and British Capital.

Development of the Tsumeb ore body was then started under the direction of C. James, who, from 1900 to 1903, proved 300,000 tons of ore containing 12.6 percent copper and 25.2 percent lead. On the basis of this information, it was decided, in 1903, to build a narrow gauge railway line from Swakopmund to Tsumeb. The line was completed in 1906 at a cost of 19,000,000 marks. When South West Africa was proclaimed a German colony in 1910, the company-owned railway was taken over by the German government. It is of interest to note that just prior to World War I, O.M.E.G. operations had reached an annual production of 70,200 tons.

The village of Tsumeb was taken over by forces of the Union of South Africa in 1915 and the mine did not resume operations again until 1921.

Production gradually rose to a peak of 208,700 tons in 1931, when the world-wide business depression of the 1930's caused a second interruption in mining activity, lasting from 1933 to 1936. Conditions had improved sufficiently by 1937 to warrant reopening the mine, and annual production reached 181,500 tons by 1939.

During World War II, the mine was closed down once more and placed in the hands of the Union of South Africa's Custodian of Enemy Property. During the war period, substantial shipments of high-grade ore from surface dumps were made for the Union Government.

Tsumeb Corporation Formed

In 1946, the property was put up for sale by the Government of the Union of South Africa and a successful bid was made by a group of American, British, and South African companies,¹ the ownership passing into the hands of the Tsumeb Corporation, Limited, in January, 1947. The dewatering and re-opening of the mine was started almost immediately. A new concentrator, designed and built for the selective flotation of copper-lead concentrates and zinc concentrates, went into operation in March 1948. The concentrates produced are presently being shipped from Africa for smelting.

¹Newmont Mining Corporation (28.5 percent), American Metal Company, Ltd., O'okiep Copper Company, Ltd. (9.5 percent), and Selection Trust Limited—Ed.

	Six Months Ended December 31, 1951	Fiscal Year Ended June 30, 1951	Fiscal Year Ended June 30, 1950
Total Accounted for by Smelters:			
Lead—short tons	16,860	32,637	32,320
Copper—short tons	5,832	11,231	8,484
Zinc—short tons	5,172	12,846	9,320
Total—short tons	27,864	56,714	50,124
Cadmium—pounds	190,579	532,449	415,924
Silver—ounces	352,486	773,582	525,481
Total Sales	\$15,089,328	\$21,177,320	\$16,014,586
Net Profits	\$ 6,909,606	\$ 8,248,101	\$ 4,561,495
Profits per share	\$1.73	\$2.06	\$1.14
Dividends Paid	\$ 4,336,000	\$ 4,309,000	\$ 417,000
Dividends per share	\$0.84	\$1.08	\$0.10
Conversion Rate—S. A.	\$2.78	\$2.78	\$3.05

TSUMEB CORPORATION LIMITED SOUTH WEST AFRICA



Simultaneous with concentrator construction, the corporation launched a major housing program to provide living quarters for the rapidly increasing European population which now numbers 2,200.

Tsumeb also operates its own hospital. The hospital was completed in 1949 and has been equipped with the most up-to-date equipment available. A well established medical plan takes care of all employees and their families with regard to noncompensable cases.

In addition to mining and concentrator operations, the corporation operates a farm which is sub-divided into cattle lands, mealie lands, dairy and pasteurizing plant, and vegetable gardens.

A recreation club, for the benefit of all employees, was established soon after the corporation took over the mine and plant. This club is on a par with the better clubs in Northern and Southern Rhodesia and the Union; in addition to the usual club facilities and sports, such as tennis, golf, badminton, swimming, etc., the club sponsors a moving picture theater, rugby, soccer, and baseball playing fields.

The above amenities have contributed much to a more pleasant and satisfactory living at the site of the Tsumeb Corporation Limited operations.

PIPE-LIKE, MASSIVE-SULPHIDE ORE BODY APPEARS TO FILL VOLCANIC PIPE IN DEPTH

By Dr. G. Söhnge

The rocks of the Otavi system rest unconformably on the igneous and metamorphic formations of the Primitive systems. The revised stratigraphic column in use at present is shown with the local names of the stages constituting the Dolomite series being derived from the three producing mines in the area.

The former outcrop of the Tsumeb ore body was near the contact of the light dolomite and the dark dolomite of the Upper Tsumeb stage. At a depth of approximately 2,100 feet, the ore transgresses into the underlying thick-bedded, light grey dolomite of the Lower Tsumeb stage (see section). A brief description is given here only of the formations encountered in the Tsumeb mine.

Lower Tsumeb Stage. The upper part of the dominantly massive, light grey dolomite is characterized by the presence of numerous layers of grey to pinkish chert. Three beds of "stromatolitic" chert serve as markers in the vicinity of Tsumeb. Impersistent bands of darker dolomite are locally developed, but no limestone beds have yet been found. While most of the chert is probably of sedimentary or diagenetic origin, some layers may have been formed much later as jasperoid replacement along permeable bedding planes.

Upper Tsumeb Stage. A natural subdivision into two lithologically distinct zones is possible. The "lower zone" consists of several wide, persistent bands of dark grey to black dolomite, alternating with light grey dolomite. The middle portion of this zone contains a few thin shaly strata



Dr. G. Söhnge
Chief Geologist

and some 20-odd beds of limestone, one of which, by virtue of its "augen" texture, is a useful marker. The dolomite commonly shows fine bedding laminae. The "upper zone" is

Series	Stage	Lithology	Maximum thickness	
Mulden Series		Arkose, quartzite, shale, slate.	2,000 feet	
Dolomite Series	Tsumeb Stage	Upper	Thin-bedded light and dark grey dolomite with subordinate beds of limestone, shale, chert and oolitic chert.	1,300 feet
		Lower	Thick-bedded to massive light grey dolomite with numerous chert stringers.	4,500 feet
	Abenab Stage	Upper	Shale and phyllite, platy and massive grey to pinkish dolomite, locally tillite.	1,500 feet
		Lower	Massive light grey dolomite.	2,400 feet
	Berg Aukas Stage		Banded light and dark grey dolomite, dark grey limestone, dark grey laminated dolomite.	1,500 feet
Noah Series		Conglomerate, grit, quartzite, shale.	2,000 feet	

characterized by an abundance of irregular pods, lenses and more persistent bands of chert or jasperoid in a thin-bedded, light grey dolomite. Two or more bands of oolitic chert near the top of the zone show cross-lamination that suggests deposition by fast flowing currents.

Intrusive Rocks

Pseudo-aplite. The pipe-like to lenticular mass of pseudo-aplite forming the core of the ore body swells to a width of 100 feet in some parts of the mine but elsewhere pinches to a few insignificant stringers. The rock is clearly injected into the fractured dolomite formations, but no evidence of thermal metamorphism has yet been found. Moreover, its mineral composition (quartz microcline, sodic plagioclase) and texture (rounded to crushed grains with secondary quartz overgrowths) have been interpreted by most investigators as indicating an original sediment. A few well rounded pebbles have been recently discovered in the pseudo-aplite injected at Tsumeb West. In the Tsumeb mine, on the other hand, the latest development workings show that minute grains of quartz and feldspar (sericitized) are locally present in the dolomite a few inches away from the contact with pseudo-aplite and these may be of metasomatic origin. The genesis of the pseudo-aplite still awaits a satisfactory explanation.

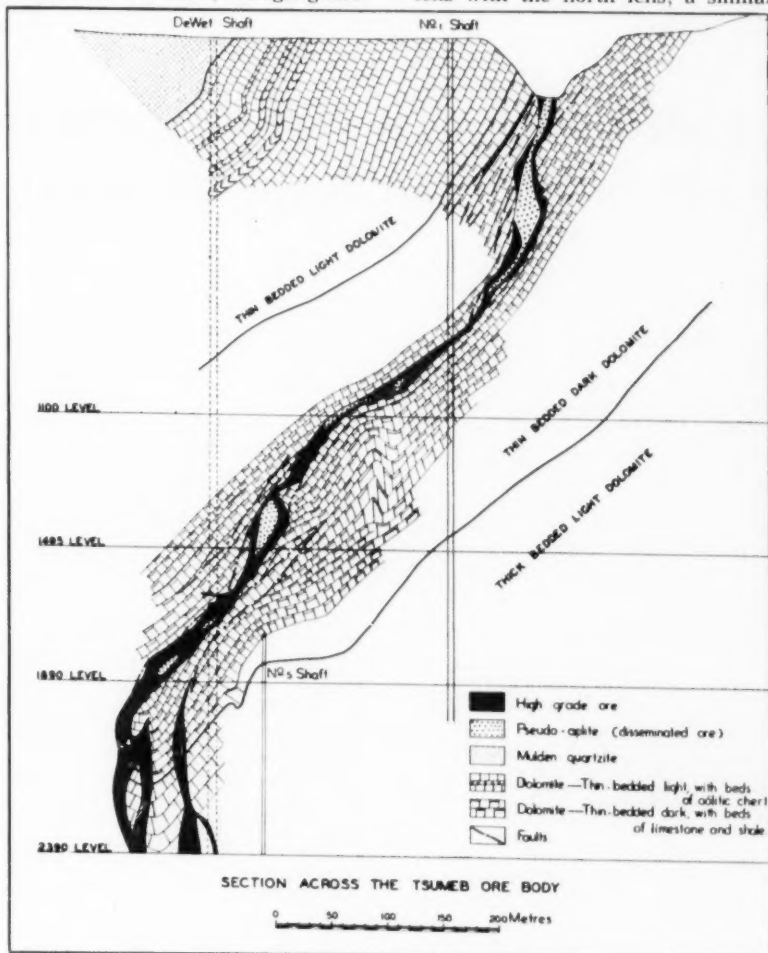
Kersantite. Several irregular dikes and sills of kersantite cut through the Tsumeb ore body down to the 1,890-foot level. The rock consists predominantly of biotite which is

intergrown with plagioclase and olivine, the mineral proportions varying in bands that parallel the contact. The kersantite, though gener-

ally much altered to clay, appears to be an igneous rock of post-ore age.

Structure

The Tsumeb ore body is on the north limb of a regional syncline plunging eastward on the west side of the mine and westward on the east side. The dark dolomite with the many limestone beds shows intense dragfolding that conforms to the regional change in plunge of the Tsumeb syncline. In the vicinity of the ore locus these minor folds have been further accentuated by pre-ore thrusting from the south upwards, whereby numerous bedding faults developed in the southward dipping dolomite. Many of these fractures are interconnected by steep, oblique shears along which brecciation of the adjoining formations appears to have been wider and more intense, thus preparing the ground for extensive deposition of primary ore. The west end of the ore body below the 1,790-foot level is determined by a steep, convexly curved fracture linking the south lens with the north lens; a similar



joint appears to be present in the deeper levels at the east end of the ore body where mine development is now in progress. It therefore seems possible that the deeper part of the ore locus may be an elliptical pipe-like structure that owes its origin not to regional folding and faulting, but to peculiarly localized fracturing; tentatively connected with the development of a volcanic explosion vent.

The kersantite dikes are seated in fractures that offset the ore slightly. Other cross-faults of probably post-ore age have been mapped near the mine at the surface.

Mineralization

The Tsumeb ore locus attains its maximum size on the 2,390-foot level where it is elliptical in plan, measuring 600 feet in length and 250 feet in greatest width. High grade ore has been deposited in a north lens and a south lens that join toward the west to form an amazingly rich concentration of massive sulphides. From the surface down to a depth

of 700 feet, i.e. in the light dolomite and in the upper part of the dark dolomite, the ore body dips nearly vertically; on entering the incompetent zone of limestone bands in the dark dolomite it assumes an average dip of 50° south, gradually transgressing the bedding until it passes out of the limestone zone and enters light dolomite of the Lower Tsumeb stage (1,990-2,090 levels). At this depth, a fracture in the footwall develops into the major north lens and the enlarged ore locus reverts to a nearly vertical attitude.

Near the massive sulphide ore the dolomite is in many places bleached to a pale grey or white calcitic rock, the mineralizing solutions having replaced magnesia by lime. The feldspar of the pseudo-aplite has been partly sericitized. Metallization was preceded furthermore by the deposition of coarse-grained calcite, dolomite, and quartz in fractures and interstitially in the breccias.

The medium-grained, massive, sulphide ore invariably carries angular inclusions of dark and light chert, dolomite, limestone, white calcite, and, in some places, pseudo-aplite.

The principal primary minerals are galena, sphalerite, tennantite, chalcocitedigenite, bornite and enargite. Minor amounts of pyrite, chalcopyrite, luzonite, greenockite, germanite, etc., are sporadically present. Locally the ore has been severely deformed by late faulting, especially near the edge of the ore body. Much of the pseudo-aplite constitutes low to medium grade disseminated ore, while part of the dolomite between the two major ore lenses below the 1,890 level can be mined as marginal disseminated ore.

The primary ore minerals have been affected by processes of weathering to depths well beyond the present bottom of the mine workings. The secondary products include "limonite," chalcocite, covellite, native copper, native silver, malachite, azurite, brochantite, cuprite, olivenite, anglesite, cerussite, smithsonite, calamine, mottramite, and many rarer minerals. The deep oxidation must have been brought about by the rapid downward flow of vadose water along solution channels in the disturbed dolomite formations around the ore locus.

HORIZONTAL CUT AND FILL STOPING USED FOR ORE BODY WITH WEAK HANGING WALL

By F. C. Pickard

The mine is serviced by five shafts all of which, except No. 5, were sunk by the former owners. No. 1 shaft—a four compartment vertical equipped with steel sets, 16-foot 3-inches by 6-foot 10 $\frac{3}{8}$ -inches inside sets—is the main hoisting and service shaft serving the mine at the present time from surface to the 1,890-foot level with stations at approximately 400-foot intervals.

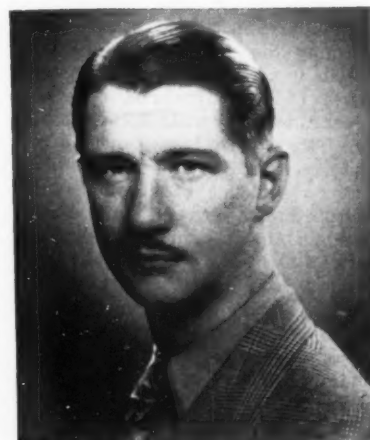
No. 2 shaft is a small, three-compartment vertical used only for servicing a waste fill conveyor on the 160-foot level.

Nos. 3, 4 and 5 shafts are internal vertical shafts—12-foot 9-inches by 6-foot 7-inches—sunk in the footwall of the ore body. These small internal shafts were originally the exploratory winzes sunk with the object of proving whether the tonnage and grade of the ore warranted deepening the main shaft.

No. 3 shaft services from the 1,100-

to the 1,495-foot level; No. 4 from the 1,495- to the 1,890-foot level and No. 5 from the 1,890- to the 2,390-foot level. No. 5 shaft will be eventually deepened to 3,150 feet. These small shafts, while serving their purpose in maintaining production from the old upper levels, are expensive to operate.

As plans for increased production progressed, it was decided to sink a new shaft from the surface 600 feet west of the ore body. The new shaft is vertical, rectangular in cross section, and equipped with steel sets. It is designed to accommodate two six-ton skips running in balance and a large man cage, with 66 square feet of floor area and balanced by a counterweight. The hoisting equipment consists of a double-drum, Ward Leonard, controlled skip hoist and an AC-operated man hoist. The shaft was connected to a crosscut on the 2,390 level in November 1951, and sinking will continue to a depth of 4,150 feet.



F. C. Pickard
Mine Superintendent

Mining Methods

The factors governing the choice of a mining method were:

1. The irregular shape of the ore body and the occurrence of high grade shoots penetrating the wall rocks outside the average limit of the main ore mass.

2. The weak nature of the hanging wall compared with the ore horizon.

3. Position of the ore body relative to surface improvements and drainage.

4. Limiting the accumulation of high grade, easily oxidized broken ore in stopes to a minimum.

Of the methods that are applicable to an ore body with the foregoing physical characteristics, economic considerations favored a continuance, in a modified form, of the original O.M.E.G. horizontal cut and fill stoping method. This method has the necessary flexibility to fulfill all the foregoing requirements. Experience with the O.M.E.G. method, which embraced the whole plan area of the ore body in one stope, demonstrated that it was inadvisable to have such large areas unsupported for long periods.

It was, therefore, decided to revise the method, reducing the size of the individual stopes by dividing the ore body along its strike length into a series of stopes and pillars, each approximately 50 feet wide. This is the present practice above the 1,890-foot level where stoping in 100-foot vertical lifts had been started by the original owners. A description of the method employed to reclaim old crown and sill pillars will be given later.

Development, Stope Preparation

The major part of the present development and exploration is being done from No. 5 internal shaft, between the 1,890- and 2,390-foot levels.

From the shaft stations, which are spaced at approximately 130-foot intervals, main crosscuts are first driven south to the footwall contact. East and west drives following this contact as closely as possible are then driven.

At 95-foot intervals along this east-west footwall drive, crosscuts are driven to the hanging wall, or south contact, and are then connected by an east-west hanging wall drive.

On the 2,390 level, the drives and crosscuts are driven 8 by 8 feet in size and will be equipped with chutes from which the stope ore will be trammed to a loading pocket at the new shaft.

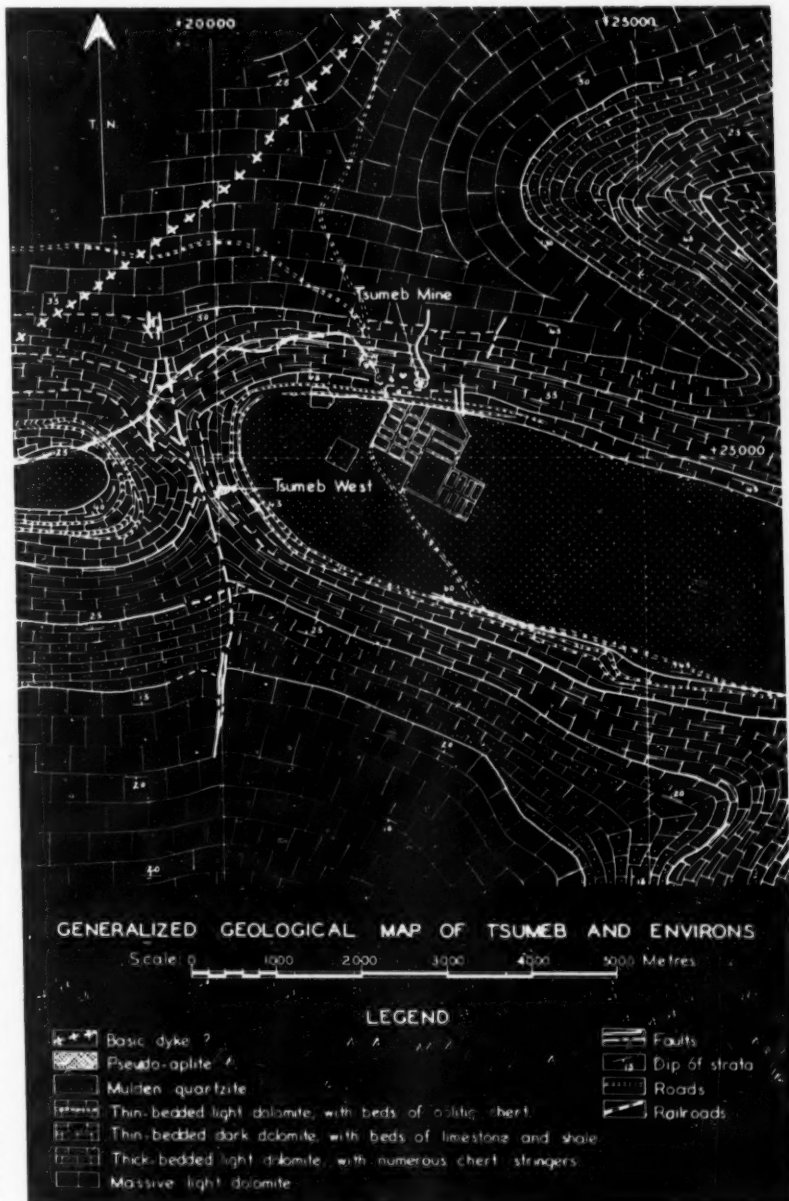
On the intermediate levels which are to be used only for stope service and fill tramping the drives and crosscuts are 5 by 7 feet.

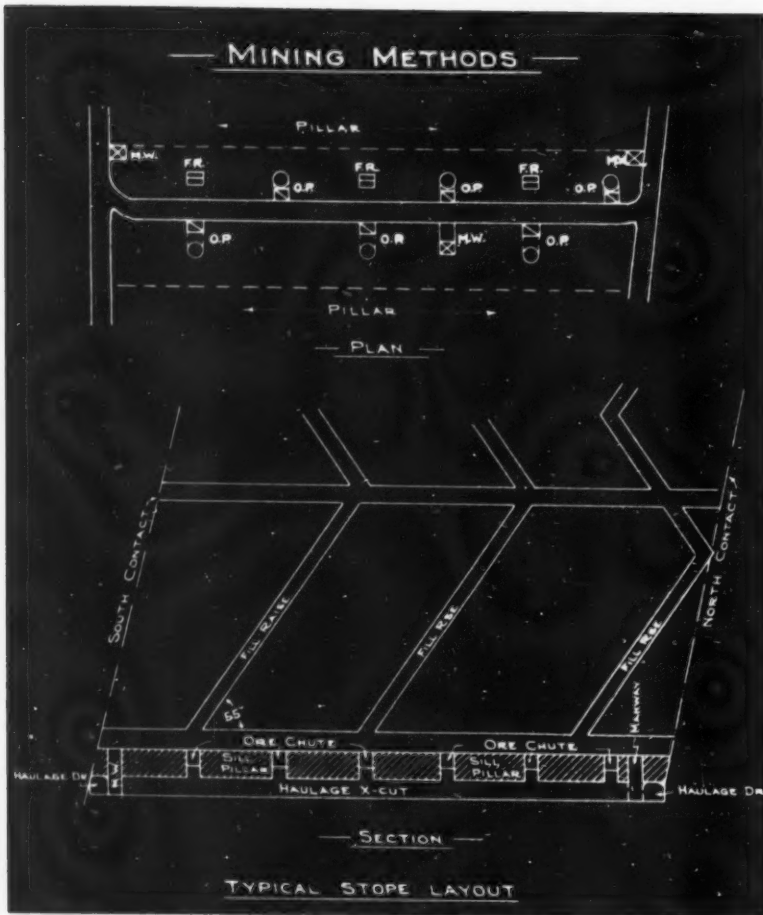
Drilling is done with three-inch drifters equipped with automatic feeds, using tungsten carbide tipped drill steel. The headings are cleaned out by Natives operating Eimco loaders. Experience indicates that

stopping panels of 60 foot width, along the strike, with 35-foot pillars between, will probably give adequate support during the stoping and pillar extracting operation; hence, the 95-foot spacing of the main haulage and service crosscuts.

A 20-foot-thick sill pillar to protect the haulage crosscuts is left in situ between the level floor and the floor of the stope. Through this sill pillar, ore passes are driven to the floor of the stope. Spacing of ore passes is controlled by the specific gravity of the ore. In average-grade stopes, each ore pass is allocated 2,100 square feet of stope area; in high grade stopes, 1,050 square feet.

Ore passes are equipped with air-operated undercut loading chutes. Three manways are provided for each stope; one on the south, one in the center, and one on the north. These manways are equipped with a manway, timber and equipment slides, and air and water pipelines into the stope. At the stope floor elevation a pilot crosscut is driven from the north contact manway parallel with the haulage crosscut below and connecting with the ore passes as it advances towards the hanging wall (see plan and section diagram). From this pilot crosscut, fill raises, one per 5,000 square feet of stope area, are driven to the level above.





Stoping

The stope is silled out (using the pilot crosscut to break to) from the north contact to south contact, to a height of eight feet. The broken ore is scraped to the ore passes using three-drum electrically operated scraper hoists.

After the silling operation has been completed, a slot is cut in the back against the north contact of the ore body from the east to the west pillars. The breast, thus formed, is then carried through to the south contact of the ore body, the machine bars being rigged on the broken ore from previous blast. The breast is drilled out using a three-inch drifter with conventional steel, the holes being eight feet in length. Experiments using jackhammers with the air leg attachment and detachable bitted steel to drill holes up to 12-foot long have recently been tried; also, three-inch diameter holes using milli-second delays for blasting. More experiments, however, are necessary before a standard practice can be established. As the ore is extracted through the ore pass system and as the breast advances beyond the fill raises, fill is introduced to form the floor upon which the next cut will be broken. This fill is spread by two drum air slushers. Before each filling, the ore passes and manways are raised to the required height. Ore passes are built, circular in shape, of concrete reinforced with old steel. Manways are built of cribbing and are carried five-feet square. They will be revised in the new section to 4 by 8 feet.

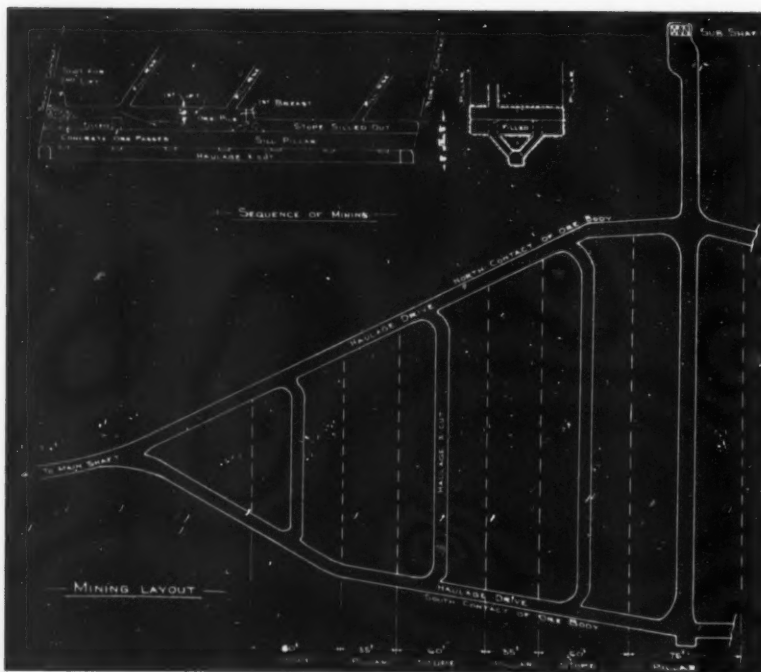
In the older sections of the mine, which had been partly stoped by the O.M.E.G. the stoping layout is governed to a large extent by local ground conditions and position of existing ore passes.

The ore passes as a rule, are constructed of locally grown tambuti logs cut into three-foot lengths, and laid radially around the 36 inside diameter ore pass opening. As most of the ore in this section has been crushed to a certain extent, a timbered method of mining has to be employed.

The method used by O.M.E.G. was a modified square set. To improve efficiency and reduce the quantity of timber required, ore remnants are now being extracted by the Mitchell Slice method. As practiced at Tsumeb, this method consists of cutting, and square setting, a series of parallel slots from footwall to the hanging wall and progressing from

Continued on Page 74

MINING WORLD



FUNCTION OF GOLD AS A NATIONAL AND INTERNATIONAL REGULATOR

By Dr. J. E. Holloway



Former Secretary of Finance
Union of South Africa

Dr. Holloway is one of the world's outstanding experts in the fields of finance and gold. He is an alternate governor of the International Monetary Fund and played an important part in breaking the Fund's objections to the sale of "premium gold." He represented the Union of South Africa at the Bretton Woods and other important monetary conferences. His remarks in this article should be thought-stirring for every taxpayer.—Ed.

Many people nowadays argue about gold. It is remarkable how many of those who do—persons in all walks of life—reason as if this were the first time in the history of mankind that the function of gold has been discussed. They ignore (in both senses of the word) the teachings of history, "the memory of mankind." They are unaware of the fact that the same mistakes have been made again and again in past ages. History seldom repeats itself as truly as in the recurrence of fallacious reasoning about money. A specific mechanism of money which works accurately within relatively narrow margins is essential to the smooth working of the whole economic system in a highly organized society. This fact is often ignored by the present generation of empirical monetary experts who draw their experience, or "expertness," from a short period during which the mechanism was put out of action by the cataclysm of two world wars.

In the early 1930's the right of the citizen to demand gold in exchange for paper money was abolished successively by one country after the other. In some countries, notably

the United States of America, it was made a crime for the citizen to hold gold. The right of the citizen to pay his foreign commitments in the one and only commodity not subject to vexatious or even ruinous restrictions on its movement across national borders was taken away from him.

In economic terms it may be said that all nations combined tacitly to reduce the demand for gold,—to make it the small change of international trade.

The world has now experienced nearly two decades of this regime. And what do we find? Has gold receded in international importance?

Money is never a worth-while object in itself. It is there to facilitate trade. Yet in the present monetary dispensation trade must be restricted in the interests of the monetary system!

Evils of Managed Money

The changes introduced in the 1930's ushered in the regime of *managed money*. In order to manage money it has now become necessary to jettison part of the object we have in view in having a monetary system. The end has had to be sacrificed in favor of the means. The machine must no longer serve the ends of man. On the contrary man must be sacrificed to the machine.

Like the little child in the legend, who cried out that the King was naked, one might be prompted to ask: Does not the fault lie in the machine? Is this mechanism of managed money not the root of the trouble? After all we never had such continuous monetary disorders when we worked with real money.

Another aspect of the demand for gold by public monetary authorities is the insistent pressure exercised by them directly and through the International Monetary Fund (until the latter threw up the sponge) to discourage and prevent the public from holding gold. The holding of gold by the public is stigmatized as "hoarding."

A third demand aspect is that probably more people hoard and smuggle gold now than ever before, despite the fact that more active measures are being taken by gov-

ernments against hoarding and smuggling than ever before.

There is clearly something in these contradictory situations which require explaining. Why is it that the more governments try to get away from the "tyranny" of gold, the more troubles they create for themselves?

There is a great deal of public discussion in this topic these days, and most of it has one common quality, that of complete bewilderment. Everything seems to be going just exactly contrary to what one would expect. Money is plentiful, yet everyone complains that he is badly off. Nearly all countries are living in boom times, yet there is a scarcity of nearly everything. People earn higher wages than ever before yet they seem to be less satisfied than ever before. The whole economic world seems to be standing on its head rather than on its feet.

Following an introduction to the subject of money in his University days, the author has studied and observed these movements for a third of a century. For a considerable period he was posted at the point of vantage of being able to observe the action from behind the scenes. He has seen a few of the great with their masks off. He has occasionally in a small way had to tend the machinery of managed money himself, and has therefore enjoyed the precious privilege of making his own mistakes. He has accordingly learned a thing here and there, occasionally seen rather more of the play than the actors.

Mechanism of Money

One thing that is continually impressed on his mind is that many people discuss money without seeming to realize that there is a mechanism of money. That mechanism must possess forces of definite power at definite points. If it does not possess these, something will go wrong at some entirely unexpected place in the vast and complicated economic system. We see these things going wrong daily but do we look for the cause in the existing mechanism of money?

The mechanism of money was in-

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"Why is it that the more governments try to get away from the 'tyranny' of gold, the more trouble they create for themselves?"

"In terms of real values, therefore, it is the present population of the U. S. A., not posterity, which pays for these goods."

"It is not clear to what extent present-day governmental expenditures are eating into capital."

"So it will continue, until the right to buy, sell, hold, import, and export gold without let or hindrance is restored to all citizens."

vented to simplify human labor and make it more productive of the things required to satisfy human wants. The primitive man who made stone axes no doubt at first went round to find someone who would give him food in exchange for his handiwork. The time spent in finding somebody who had surplus food, and who wanted an axe, and the time spent on arguing how much food should be given for an axe, was however lost for the task of making another axe. In modern parlance, the number of man-hours spent on each axe was somewhat excessive. When therefore some primitive man, the prototype of modern financiers, found out that much time could be saved by giving the axe-maker *something that everybody wanted* in exchange for his axe, money was invented.

It is therefore important to show where the breakdown of the monetary mechanism has unleashed these destructive forces, and how the breach can be healed.

Primitive man, being essentially a realist, did not part with the produce of his labor except in exchange for something desirable on account of its own properties. The "money" that he accepted had, therefore, in the words of the French writer Chevalier to be "a material equivalent or compensation" for the goods with which he parted. It would never have occurred to him as reasonable to part with the products of his labor in exchange for a piece of paper that alleged that it was worth those goods. The thing that he took in exchange had to have an *integrity* of its own. This gave him an important safeguard which no citizen possesses today. It made it impossible for him to be deprived of part of the produce of his labor by the confidence trick of giving him something alleged to be equivalent to that with which he parted but which in fact regularly proved to be worth less every time he tried, even after as short a period of time as one month, to exchange it for the same value of goods. This is the characteristic of practically every paper money of today. Our primi-

tive ancestors were wiser in their generation than we are. They did not allow themselves to be caught, (and like ourselves to be caught again and again) by such a simple trick.

Our generation has seen the abandonment of this qualification for sound money. It has had ample experience of the effects of this surrender of the safeguards which were regarded as essential in all ages before our own.

Let us have a look at the nature of these safeguards, and let us consider what forces have been let loose on the world by their abandonment.

The safeguard of value for value meant that individuals and communities were forced to live within their means. It strongly reinforced the moral concept of responsibility, without which there can in the long run be no civilized society.

Gold Is Integrity

The measure of security which a sound monetary mechanism provided, enabled mankind to devote its attention undivided to the task of the creation of the material means of well-being. Its symbol was gold. Gold is integrity and gold minted into well-known coins of an easily determinable weight and fineness is proven integrity, even to the most ignorant and illiterate.

In parenthesis it should be said that the development of credit does not take away from this integrity and this responsibility. For in a credit system based on the right to demand gold, the role of responsibility is assumed by the creditor.

This safeguard was removed when money became paper money and paper money was shorn of the adjunct of being convertible into a "material equivalent or compensation." For money which had an integrity in itself, mankind received the new-fangled device of bureaucrats called "Managed Money."

Now there is one thing that is beyond cavil in this regard and that is that it is a miracle if managed money is not mismanaged. Occa-

sionally in the past there have been short periods of inconvertibility when this rule has not applied owing to "the exceptional prudence and moral courage of legislators or fiscal authorities" as one writer puts it. But down the ages we find the doleful tale that inconvertible currency generally depreciates.

Unbalanced Living

There are two far-reaching ways in which the community can drift into the dangers resulting from the attempt to live beyond its means. In the first place its government can exceed the proportion of the national income which is set aside for it to spend. This produces the evil of *unbalanced budgets*. In the second place the community as a whole can exceed the amount which is available to it for spending outside its own sovereign limits. This produces the evil of *unbalanced foreign exchanges*.

Most countries suffer from both these evils today. The fortunate ones suffer from only one of them. Both are essentially a result of the attempt to live beyond one's means. Both reduce the means to a lower level than that which would be available with a well-ordered monetary mechanism.

Under the present-day regime of managed money a government, while naturally borrowing as much in real values from its citizens as it can manage to secure, somehow never gets enough this way. It therefore "manages money" to get more. It has recourse to bank credit or created credit. It gives its citizens promises to pay which are not represented by any real value. It increases the quantity of money in its own control without increasing the quantity of goods and services. It accordingly takes away some of the goods and services belonging to its citizens without giving them "a material equivalent or compensation." The result is inevitably inflation of the currency, depreciation of the value of all existing money, a rise in prices and disruption of the good order and stability of the economic system.

It would be trite to say that a country can only consume, or stockpile or give to other countries, the goods and services which actually exist. One cannot consume now the goods which have still to be produced by posterity.

In terms of real values, therefore, it is the *present population* of the U.S.A., not posterity, which pays for these goods. There would be an exception to this if the U.S.A. could persuade some other country to

lend it the goods which that other country now produces, in return for goods which the future population of the U.S.A. (its posterity) will still produce. Let the reader reason out for himself from which other countries the U.S.A. can now borrow such goods and he will know how much of the real burden the present population of the U.S.A. can pass on to posterity.

Present Citizens

Clearly the whole burden is borne by the present generation of the U.S.A. citizens, and what they do not pay in taxes they pay by virtue of their money becoming worth less and less month by month. That reduction in the value of their incomes or fortunes represented in terms of dollars is an indication of the amount of their goods and services which the government takes in addition to the amount they pay to the government in taxes. They may imagine that by resisting the imposition of new taxes they are saving themselves money. Actually they are paying the full amount, now and in this generation. Inflation is the most effective (and at the same time the most destructive) system of taxation ever invented. The goods and services taken by the government and paid for by these means are no longer available for use by its citizens. They represent the real cost to the community of the varied activities at home or abroad, of the government. If there were a system of payment in real values, or in other words in money convertible into gold, the public would know how much they are taxed. At present inflation is a hidden tax and nobody knows what it costs.

It is not clear to what extent present-day governmental expenditures are eating into capital. Every industrialist knows that it is not enough today to set aside for replacement of his machinery only the amount which represents the physical depreciation and the obsolescence of that machinery. If in x years he has completely written off a machine he will yet find that he has set aside only enough to replace one half or even less than one-half of that machine. The government has taken the rest, not in direct taxation, but in taxation through inflation. If the private industrialist is wise enough to make provision for this, no great harm will be done. If he is not, trouble is storing up for the future. The fact remains, however, that *taxation through inflation is a tax on capital*. It is a pernicious tax, a tax easily capable of evasion by the strong and the wealthy, a tax

impossible to evade by the weak and the poor.

The plain fact is that when governments and communities live beyond their means they are engaged in a process of reducing even the means which they had at the start. They create insoluble problems for themselves and it is only when they come to a serious crisis that they begin to take account of the facts.

The simple mechanism of paying value for the value of what one receives has gone wrong, and the new mechanism of managed money by which governments can get from their subjects not only taxes but also "something for nothing" in addition to taxes, has created all these anomalies.

Gold Assures Value For Value

There is no force strong enough to correct these anomalies except the force exercised by the necessity to give value for value. The value given must be a value which is universally acceptable. This cannot be created in a day. After a period of trial and error running through the ages human beings have given this role to gold and convertibility of currencies into gold is the only force strong enough to restore our own economic system to full health. That force is exercised by millions of people insisting on getting what is due to them and having a material in which their dues can be readily measured. This will force governments to live within their means. Nothing else will. Nothing else is strong enough to encompass this task.

U. S. A. Subsidizing

It is clear from an analysis of the international repercussions of managed money that exchange and import controls will continue as long as managed money continues, and that the U.S.A. will have to go on subsidizing countries as long as a monetary mechanism is maintained which obviously encourages over-spending on international account.

The re-introduction of a value-for-value basis for the monetary system will put an end to the frightful disorganization in international economic relations which has made the post-war era a nightmare. Not a single international economic problem has been solved by the frequent post-war international economic and financial conferences. They have applied palliatives, have adjourned, and met again later only to apply stronger and more widespread palliatives. We shall no doubt see more of these sticking-plaster economic conferences. We

shall not even begin to find a way out of the economic problems, which now beset all the world, until we realize that sticking plaster does not cure deep-seated disorders. The flaws lie in the present day monetary mechanism, and the more consistently that mechanism is made to work the worse will become the world's economic disorders.

Restore Rights To Citizens

So it will continue, until the right to buy, sell, hold, import, and export gold without let or hindrance is restored to all citizens.

The system of managed money, with all its vast trappings of controls, embargoes, import and export restrictions, its armies of enforcement officers who must be maintained by the industry of their fellow-citizens, has failed. Its failure is due to inherent causes. Nobody bears responsibility for its failures. Mistakes do not bring retribution. These are thrown into a box, until the box is so full that a "crisis" has been created. An international conference is then held, temporary palliatives are resorted to and the whole merry-go-round starts all over again.

The mechanism of a sound monetary system must provide forces which will serve as a safeguard against abuse of the system by the executive government to the detriment of its subjects and which will keep countries on sound financial lines in their dealings with other countries. Managed money provides neither of these. On the contrary it makes a departure from the paths of honesty and prudence initially more attractive than the reverse course.

Convertibility of currency into gold provides both these forces. Gold possesses in a higher degree than any other known commodity the technical requirements of good money and in addition has the quality, built up over ages of human experience, of being acceptable to all peoples irrespective of the level of their development or education. It is true that even gold is not as perfect a measure of value as, for example, the pound or the meter is of weight and length. This, however, means only that the best that mankind has invented in this field falls short of the perfect.

On the other hand it is vastly superior to managed money which possesses none of the technical qualities necessary in sound money and the abuse of which is now threatening the very economic basis of personal freedom in civilized communities.



COUNTER GIVES RADIOMETRIC ANALYSIS OF URANIUM ORES

A. F. Boyd, secretary and manager of mines for the Minerals Engineering Company, Grand Junction, Colorado, reported the following on a new Geiger counter.

The Mineral's counter, Model 600, has been designed to give a radiometric analysis of uranium ores as well as having the feature of high sensitivity for prospecting in the field.

The counter was developed by Gordon Babbel in 1948 and redesigned in 1951 to include new improvements. He now supervises the manufacture of Minerals Counters for Minerals Engineering Company's Radiation Counter Division at their Grand Junction, Colorado, factory.

The counter is more than a detector, and when properly controlled is accurate within 0.02 percent in determining the grade of uranium in ores. The following is a comparison chart of Mineral's Model 600 Geiger counter readings with wet assay results by one of the uranium processing plants on the Colorado Plateau:

Percent U ₃ O ₈ by Mineral's counter reading	Percent U ₃ O ₈ by wet assays	Percent U ₃ O ₈ by Mineral's counter reading	Percent U ₃ O ₈ by wet assays
0.10	0.10	0.05	0.06
0.14	0.15	0.16	0.15
0.06	0.07	0.10	0.11
0.08	0.08	0.12	0.14
0.16	0.15	0.21	0.17
0.10	0.10	0.10	0.12
0.08	0.08	0.10	0.07
0.08	0.09	0.14	0.12

By using a known pulp the counter is calibrated with the righthand brass knob which controls the size of the

Model 600 geiger counter manufactured by the Minerals Engineering Company is small, accurate to within 0.02 percent U₃O₈, and does not require expensive batteries to operate. It is shown here with a probe and cable used in measuring radioactivity of bore holes.



30

pulses in the pulse-generating-circuit, this controlling the amount of meter deflection for a given amount of radiation. Once calibrated to register the assay value of the known pulp on the direct reading dial, the counter is in adjustment for analyses of unknown pulps. For accuracy the unknowns must be the same bulk size as the known. This can easily be done by measuring the known pulp in a receptacle, and then duplicating this amount with the unknown, using the small sample envelopes for containers. From one to five ounce samples are normally used.

All pulps should be ground, as near as possible, to the same mesh and each container containing the same quantity of sample (measurement by volume is accurate enough) to obtain accurate results.

If regular pulp sample envelopes are used, the sample should be distributed evenly in the envelope to a fairly uniform thickness. All containers should be placed on the counter tube in the same position.

In order of sequence the steps necessary to make a U₃O₈ determination with a Mineral's counter are as follows:

1. Prepare sample to be analyzed.
2. "Zero out" the background count by means of the zero control knob.
3. Place sample of known analysis on counter tube and adjust calibrating control to standardize so that the meter reads the same as the assay of the standard.
4. Remove standard. Place sample to be analyzed on counter tube. Direct reading on the meter is the assay value.

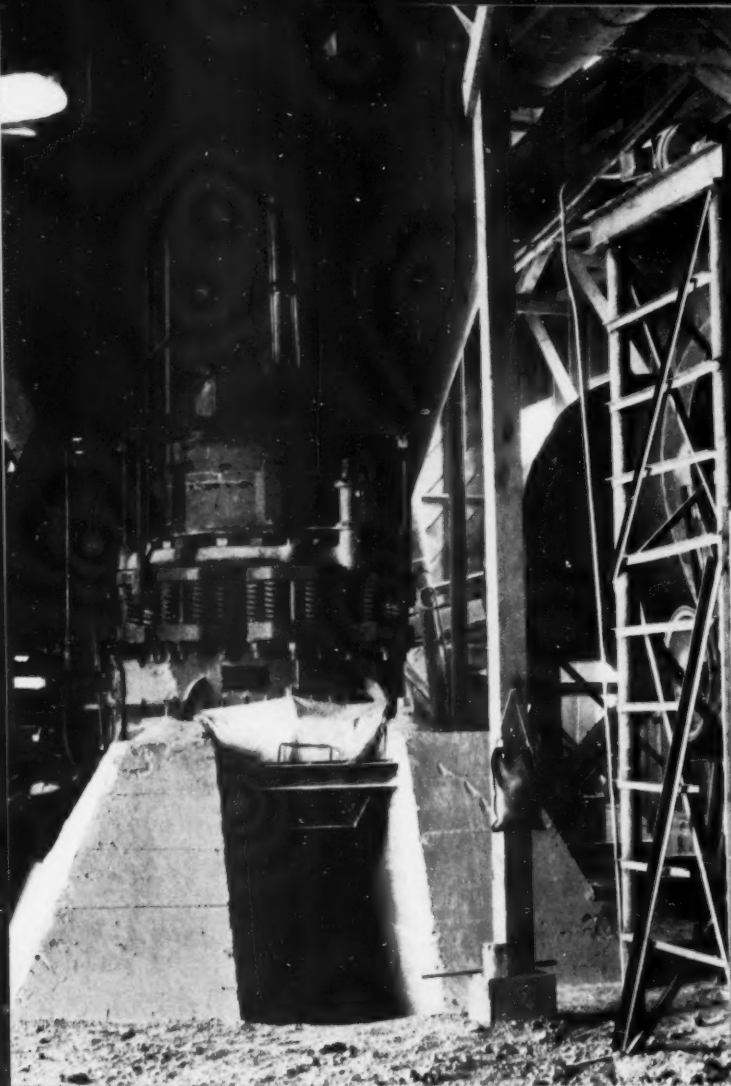
The counter has five ranges of sensitivity for use in measuring radiation in low grade ores as well as the intense radiation of high grade ore.

The Mineral's counter is invaluable to the uranium producer. By its use the shipper can determine the grade of his ore before shipment, which in many cases as when the grade is marginal, means the difference between profit and loss. The grade on shipments of ore over an eleven month period, January 1951 to December 1951, from a Temple Mountain property in Utah, were predetermined by the Mineral's counter. Over this period the difference in any one month between the counter results and the wet assay results by the Atomic Energy Commission was not over 0.02 percent. When factors, such as hauling costs, are important and ore is of marginal grade for shipment counter can pay for itself in assaying one load of ore.

The return assays from the processing plants lag from 10 days to two weeks. The producer is in the dark for this period because he does not know the grade of his shipments without a counter which will give an analyses. The sample pulps are usually returned in a few days. These pulps can be analyzed by counter providing a

Continued on page 75

MINING WORLD



D397 Electric Set Powers Perlite Mill

Perlite is a crushed volcanic rock product that can be "popped" like corn and is used as an insulating material.

At the perlite mine operated by F. E. Schundler & Co., Inc., near North Agua, New Mexico, the source of all power for the crushing mill is a "Caterpillar" D397 Diesel Electric Set. Equipped with air starting, the unit generates 314 kw. in steady, 12-hour service. The current it produces drives electric motors that deliver over 200 hp. to operate the various types of machinery in the mill.

As on many other mining jobs, the heavy-duty D397 is proving the value of ample power coupled with sturdy "Caterpillar" dependability. It performs equally well in dusty conditions, in heat or cold, or at high altitudes.

In these times, national defense demands that you give good equipment extra care. "Caterpillar" machines are built for long, tough service. But a few minutes spent on proper maintenance each day will pay off in many added hours of trouble-free work life. Consult your "Caterpillar" Dealer. He's there to help you. Make the most of all he has to offer.

CATERPILLAR, SAN LEANDRO, CALIF.; PEORIA, ILL.

A "Cat" D397 Electric Set powers F. E. Schundler & Co.'s perlite mill near North Agua, New Mexico. The company also owns a "Cat" D7 Tractor and a Gardner-Denver compressor powered by a D13000 Engine.

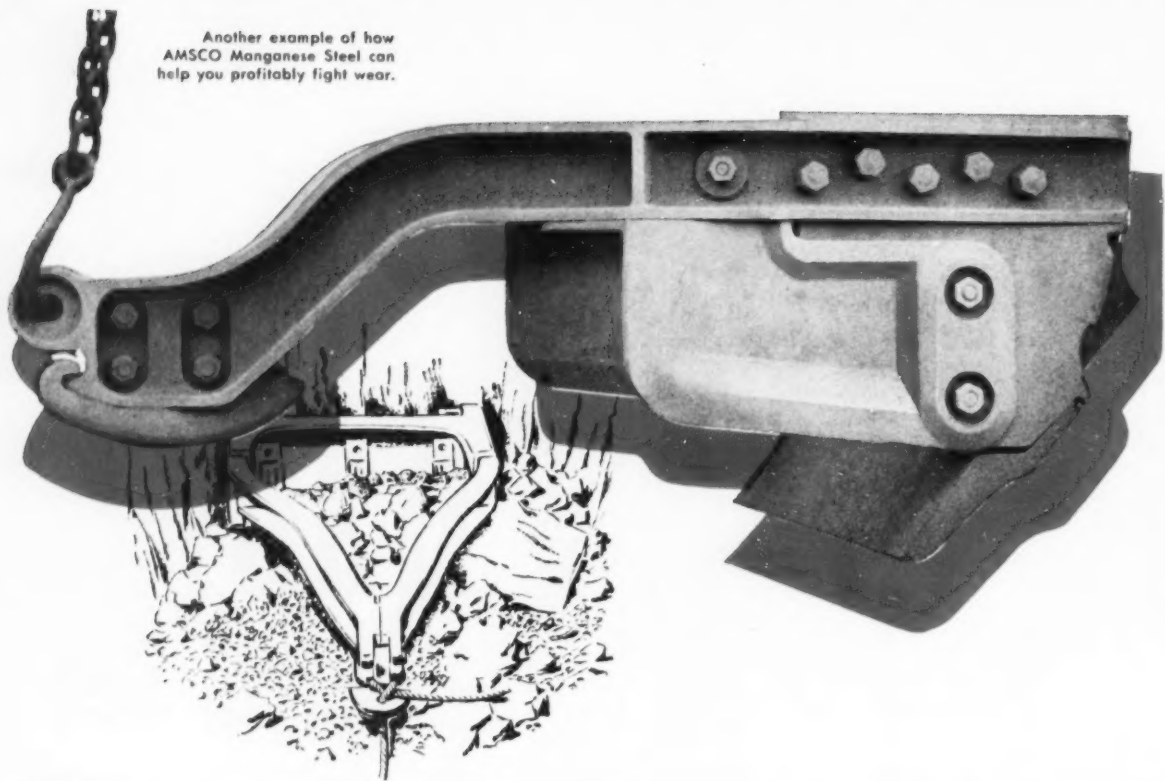


CATERPILLAR

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TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Another example of how
AMSCO Manganese Steel can
help you profitably fight wear.



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How AMSCO Manganese Steel proved tougher than a tough mining problem

One of the toughest mining operations you'll find anywhere—tough from the standpoint of how it punishes equipment—is scraping heavy, corrosive pyrite ore. For example, a California mine has a deposit of 98% pure pyrite—with a specific gravity of 4.8. Impacts and abrasion caused by this ore were making short work of the scrapers previously used . . . on the average they needed major repairs over 4 times per year.

Several years ago two scrapers of the type shown above, which are sold exclusively by Joy Manufacturing Co., were put in service. They were made entirely of AMSCO Manganese Steel, and since then they've mined over 220,000 tons of pyrite ore — and they're still in excellent condition! These scrapers are repaired only once a year; simple repairs involving reliping and hardfacing of wearing surfaces.

Obviously, not all mining or excavating operations are as equipment-punishing as this one . . . but the moral is clear . . .

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AMSCO controls impact and abrasive wear in 5 basic industrial operations:



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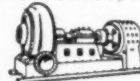
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SURFACE AIR CONDITIONING UNITS ARE NOW APPLICABLE FOR MINE COOLING

By H. D. Moore

Division Engineer
Worthington Pump and Machinery Corporation
Los Angeles, California

The cooling of mines is desirable from both the owner's standpoint and from the viewpoint of the workman. In the first instance, the owner desires to get more work from a workman in a given time. From the workman's standpoint, he will obtain greater comfort and his work will, therefore, be easier for him.

When I speak of comfort, this of course, is a very relative term and the ideal situation, that is, where the greatest number of persons would say they were comfortable. When at rest this would be at an effective temperature of about 71°F. Effective temperature is a fictitious temperature line drawn on a psychrometric chart which would provide equal comfort conditions to that obtained if the air were saturated at a dry bulb equal to the effective temperature, thus, 80°F. and 23 percent relative humidity would lie on the 71°F. temperature line as would also 78°F. and 38 percent, 75°F. and 61 percent or 71°F. saturated. It will be noted that at the higher temperatures and lower relative humidity, there will be a tendency for the lips and nostrils to become dry, and at the higher relative humidity, there will be a feeling of mugginess, so strictly speaking in the extremes along this line equal comfort is not actually provided. Cooling engineers ordinarily endeavor to hit somewhere about the middle of the humidity scale.

Temperature Limit

As temperatures diverge from this ideal situation, people become less and less comfortable, and as temperatures rise it becomes more and more difficult to do physical labor. The actual physical limit for the human body for a continuous exposure is possibly in the neighborhood of 90°F. effective temperature. Above this, there is a tendency for the body temperature to rise and heat stroke or other physical failure may result. If the person is doing physical labor, this result will happen more rapidly.

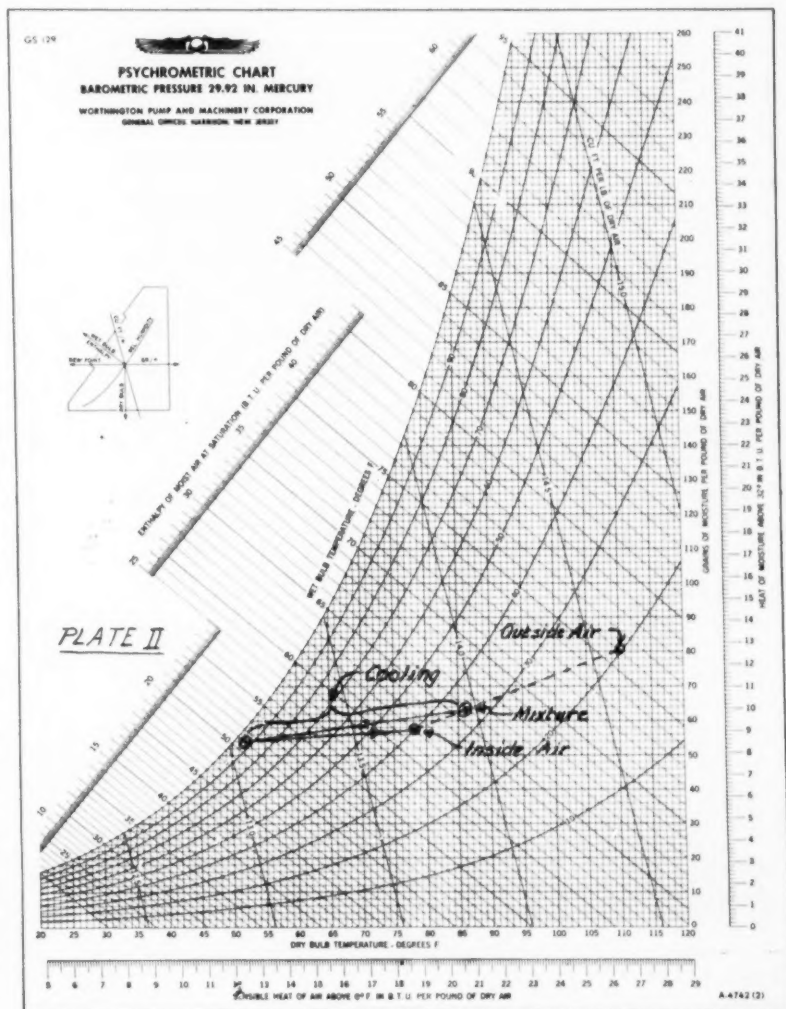
MAY, 1952

The human body is like any other prime mover, in that it takes fuel which is converted into energy with some mechanical losses which must be dissipated in the form of heat. It is well known that the normal body temperature is approximately 98.6°F. When the surrounding dry bulb temperature is below this there will be a direct cooling effect due to heat transfer directly from a body to the surrounding air causing a rise in air temperature. This is what we know as sensible cooling. As the dry bulb temperature of the surroundings rises the body develops a film of perspiration. This, of course, tends to vaporize and absorb heat from the body as it does

so. That is, cooling occurs until the air becomes saturated. At such time no more vaporization could take place and no cooling effect could be obtained from this source.

Sensible and Latent Cooling

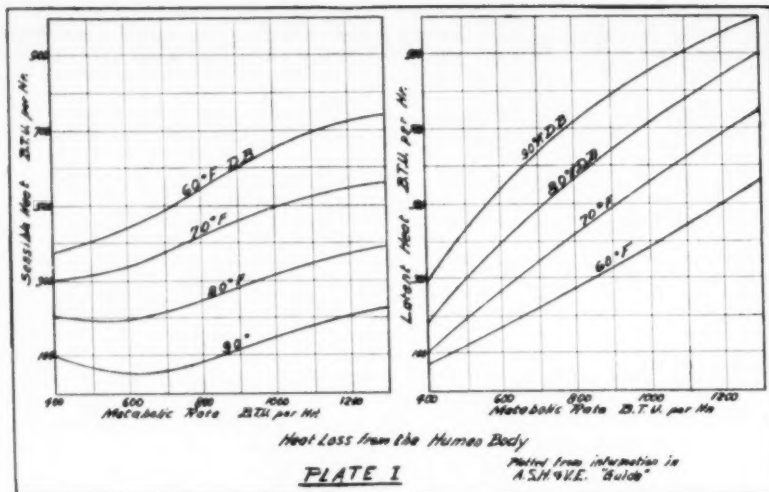
Plate Number 1 has been prepared to show the relationship of sensible cooling and latent cooling to the metabolic rate of the human body. The metabolic rate of 400 B.t.u. per hour approximately represents the condition of rest, and 1,200 B.t.u. per hour would represent extremely hard labor. It will be seen from these charts that the heat dissipated by direct conduction, that is, sensible



heat, decreases as the temperature rises and the latent cooling increases as the temperature rises. This is due to the effect of perspiration as mentioned above. It will also be seen that as a metabolic rate increases, that is, as a person works harder, there is a tendency for more of the cooling effect to be done by latent effect and only a small increase of the cooling is done by sensible effect.

Thermal Gradient

As greater depths are reached in mines, there is a tendency for rock temperature to increase. This variation is known as the thermal gradient and varies from about 1°F. in 50 feet of depth to 1°F. in 200 feet of depth, with an average probably of about 1° for every 100 feet. There is also a tendency for air which is introduced from surface levels to increase in temperature as it reaches greater depths due to what we call adiabatic compression. This amounts to about 1° to every 400 feet. Moreover, most mines have a consider-



able seepage of water which results in the air in the lower levels becoming practically saturated at close to rock temperature. In the case of deep mines the temperature conditions

are such that work is practically impossible for any great length of time, since the saturated air practically refuses to carry off the necessary heat losses from the body.

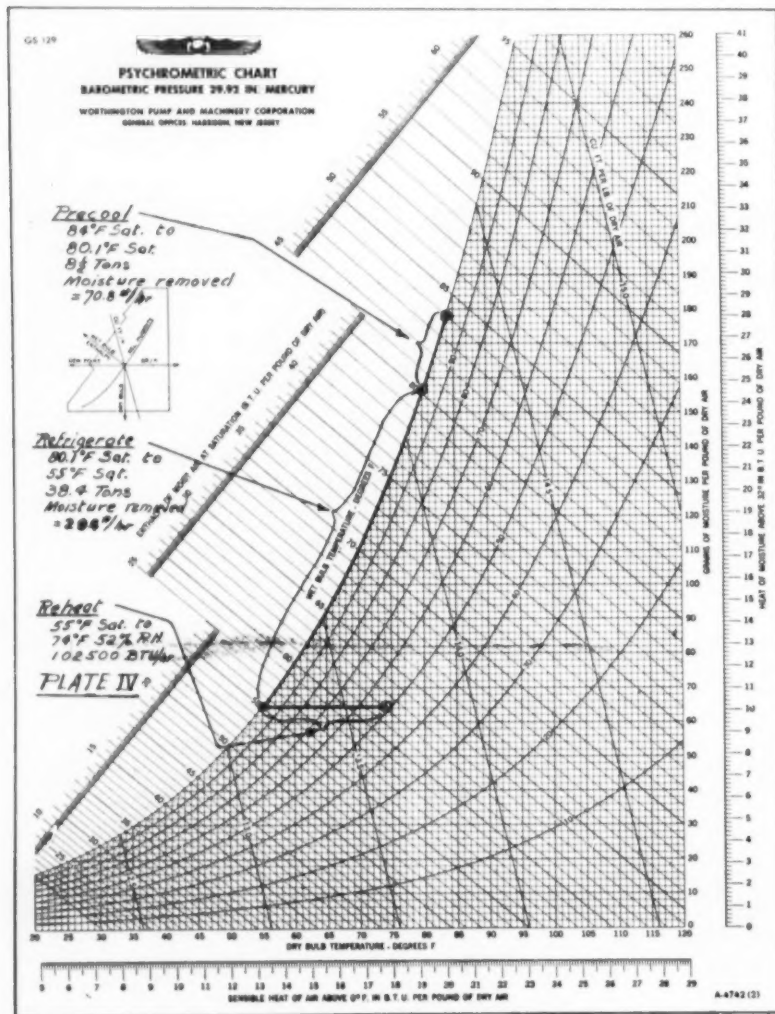
For a good many years, practically all mines excepting the open pits have been provided with some form of mechanical ventilation. This is necessary both from the standpoint of removing the gases from blasting operations and for providing sufficiently pure air for breathing purposes. The result is that from a standpoint of chemical or physiological impurities the air in most mines is good but at great depth, labor is very difficult on account of the high effective temperatures and the fact that the air is saturated.

Cooling Not Enough

There are quite a few mines which have installed cooling equipment on the ventilation air. The idea being that over a period of time the rock temperatures would be so reduced that comfort could be obtained. Other mines have installed local cooling equipment which takes some of the air from the mine, passes it over cooling coils and returns it to the mine. Both of these methods have been quite disappointing in their results.

Unfortunately when air is cooled by a coil, if it is not already saturated it tends to become saturated. If it is saturated, considerable moisture will be removed. The air merely becomes saturated at a lower temperature. Furthermore, if this saturated air at the lower temperature is mixed with some of the air from the mine which is also saturated, the mixture itself will be saturated.

Plate Number 2 shows a psychrometric diagram for a typical air con-



ditioning job. It will be noted that in this case there is sufficient heating effect without the addition of moisture so that we are always dealing with air which is not saturated and after the air passes over the cooling coils and becomes close to 100 percent relative humidity, that this in turn mixes with room air a low humidity and, therefore, does not result in a saturated mixture. It can be seen on this diagram the effect of mixing two quantities of air along the saturation curve. The result is saturated air.

Cool and Reduce Saturation

Plate Number 3 shows a diagram of cooling system which is designed to reduce these difficulties. It will be noticed that I have selected a rather severe condition in which the air in the mine is taken at 84°F. saturated where it enters the coils. There is an initial coil which utilizes water as a cooling medium, which is called a pre-cooler, this cools the air to approximately 80.1°F. and as stated above this will also be saturated. In doing this, it requires approximately 8.6 tons of refrigerating effect obtained from the water. The second coil applies about 38.4 tons of refrigeration and cools this air down to 55°F. and again it is saturated. The first coil removes about 22 grains of moisture per pound, the second coil

removes about 91.5 grains per pound of moisture, but the reduction in dry bulb temperature still keeps the air saturated.

Following these coils the air is passed through a set of moisture eliminators in order to insure that none of this moisture is carried on mechanically by the air. It then passes through a third set of coils which heat the air from 55°F. to approximately 74°F. This heating effect is obtained from the first coil. It will be noted that in so doing, no moisture is added and, therefore, relative humidity is reduced to approximately 52 percent. This air then can be supplied to any occupied area in the mine and in fact can be blown through a duct right up to the working face. As it mixes with the air from the mine it will reduce the relative humidity and provide the necessary cooling effect in latent form, thus, the workmen can extend their working time and production is bound to increase. This is to say nothing of the additional comfort and good will which will be obtained from them.

Plate Number 4 shows a psychrometric diagram for the above unit. Again it will be seen how it cools the saturated mine air along the saturation curve without the addition of moisture and thus, reduces the relative humidity and thus, reduces the relative humidity. It should be noted

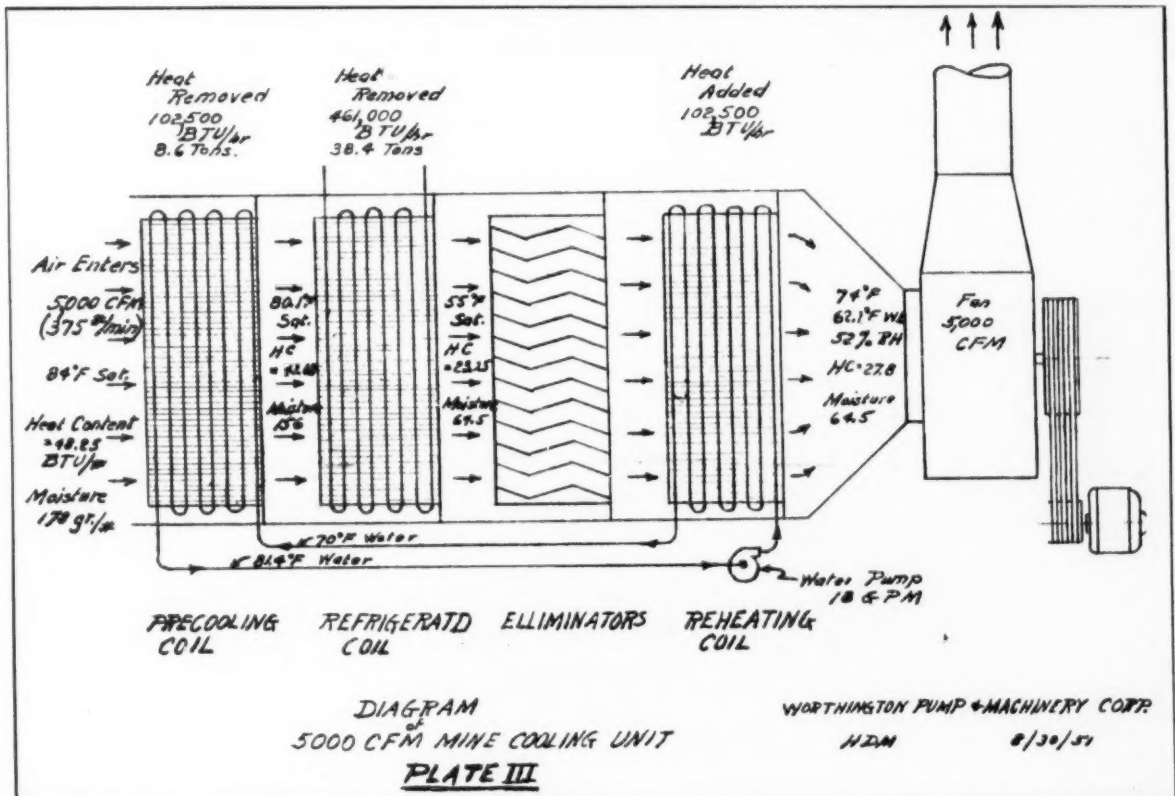
that no outside source of heat is required for this re-heating.

Cooling Unit Performance

The unit shown is for 5,000 cubic feet of air per minute and would remove about 30 gallons of water per hour from the air. About one fifth of this is done by the first coil at no cost for power. So this is one instance where you get not one, but two things for nothing. It is possible to build these units in practically any size which may be desired. The refrigerating effect may be in the form of chilled water circulation from a central plant or direct expansion coil utilizing refrigerating equipment in the immediate vicinity.

The coils as used in these units are the standard items customarily seen in surface air conditioning installations. The only difference would be that for use in a mine the casings should be of heavy plate and the general construction much more rugged than is commonly used. This is due to the fact that it is unavoidably subject to considerable abuse which ordinary air conditioning unit is not.

In case an installation necessitates a number of units, centrifugal refrigeration might be used with chilled water circulation to each of the individual units.





Arrows point to two of the uppermost adits on the Ivanhoe claim. These adits were the source of samples which resulted in the 1951 recognition of Browne's Lake as a significant scheelite-powellite deposit. The photograph was taken in March 1952 by the author.

MONTANA'S BEAVERHEAD TUNGSTEN

Winter prospecting and mine development have extended known scheelite-powellite mineralized area with indications of huge low-grade ore reserves

By J. H. Waterhouse
Mining Engineer and Consultant
in Mining Geology
Dillon, Montana.

"Today, the United States and the Free World stand on the verge of tungsten starvation. No foreseeable eventuality will provide all the

tungsten needed by the European democracies and the Americas in meeting their essential civilian and military needs."¹ When United States Senator Lyndon B. Johnson, Chairman of a Senate Subcommittee charged with determining the reason for the failure of the Munitions Board and the Department of the

Army to accumulate an adequate stockpile of tungsten during the period following 1946 stockpiling legislation, wrote these words a few months ago, he knew that the survival of the United States and the non-Communist nations was jeopardized by the acute shortage of this vital steel-hardening element.

Tungsten is a foundation stone of the United States' military plans. The armor-piercing shell-core program, jet engines and atomic energy work, all use tungsten as the principal constituent of the steel used. Tungsten is employed for filaments in electric lights and in the production of high speed, metal-cutting tools because of its having the highest melting temperature (3,410° ± 20° C.) of all known metals. It is used in electronic equipment, switch gear, welding rods, contact points, and X-ray targets.

Western Montana tungsten re-

J. H. Waterhouse and the four-wheel-drive pick up used to reach the Beaverhead County tungsten deposits in January 1952.



¹ Johnson, Lyndon B., 27th Report of the Preparedness Subcommittee of the Committee on Armed Services, 82nd Congress, 1st Session, July 5, 1951.



LEFT, Roscoe C. McLaughlin checks a tungsten outcrop on the Browns Lake claims. In 1942 he found tungsten mineralization in Rock Creek Canyon. RIGHT, Owners of the Farlin Gulch claims on Birch Creek are LEFT TO RIGHT, Carl Guidici and C. Heinz. Guidici also has claim ownership at Adams Peak and Sugarloaf.

erves were estimated "in October 1951 to contain 1,900,000 tons of ore averaging 0.35 per cent WO_3 ."²

In June 1951 when the author entered Beaverhead County, Montana, to undertake the appraisal of mines and mineral prospects of the Missouri Basin drainage system, it was unforeseen that in this part of the United States a new major low-grade tungsten area would be discovered.

Northwest of Beaverhead County, at Black Pine, a hübnerite deposit was leased by a former U. S. Bureau of Mines engineer who had contracted core drilling of the property as a Bureau exploration project. The scheelite-powellite property situated near Browne's Lake, Beaverhead County, had been examined by a Geological Survey Bureau of Mines team of which the writer was a

member. Other evidence in western Montana of the significant character of the region as a future tungsten mining center was not impressive at that time.

Since commencing private consulting engineering practice, the writer has examined properties from Rock Creek, Beaverhead County, southward to Bridge Gulch and Sheep Creek, southern tributaries of Birch Creek, and verified the presence of scheelite or scheelite-powellite in a north-south belt of from 16 to 18 miles in length.

Tungsten occurrences north and south of this belt may extend the productive zone to 40 miles in length. However, there is now insufficient evidence to suspect continuous mineralization from surface exposures over the greater length. The genesis, mineralogy and attitude of the outly-

ing deposits differ greatly from the deposits of the shorter inner arc.

Tungsten deposits in the United States lie almost wholly in the area stretching from the Rocky Mountains westward to the Pacific Coast. The only known deposit of tungsten minerals by magmatic segregation is in the Whetstone Mountains 12 miles east of Benson, Cochise County, Arizona. Contact metasomatic deposits of tungsten are the prevailing type of commercial tungsten occurrence in the United States.³

Mineralization Around Stock

In Beaverhead County, a quartz-monzonite intrusive body, the Mount Torrey stock, in Tertiary times forced itself into the area now constituting the highest topographic relief of northern Beaverhead County. The heat of this igneous intrusive metamorphosed Paleozoic limestone formations into hard tactite. Upward force of the intrusive, exerted from the west, tilted the Paleozoic formations south of the Browne's Lake deposits and gave them a definite high-angle eastward dip, particularly noticeable in the Lost Creek area, where the surface exposure of the Amsden formation is its upper edge rather than its width in a direction from west to east.

2. McGlashan, Donald W., and Roys, Perry F., *The Tungsten Situation in Montana As A Factor in National Defense*, Miscellaneous Contributions No. 12, State of Montana Bureau of Mines and Geology, p. 3, 1952.

3. K. C. Li and C. Y. Wang, *Tungsten, its History, Geology, Ore Dressing, Metallurgy, Chemistry, Analysis, Applications and Economics*, Reinhold Publishing Corporation, New York, 1947.

Exploration at the Snowshoe property whose location is shown by the arrow continued throughout the 1950-1951 winter. It is on Sheep Creek; a southerly tributary of Birch Creek.



MAY, 1952



The Shafer brothers, John H., LEFT, and Stanley D., RIGHT, are part owners of tungsten claims on Taylor Creek.

At the time the igneous mass reached its highest temperature, solutions containing tungsten entered the Amsden limestone combining with calcium to form scheelite (CaWO_4). At lower temperatures, molybdenum was added to form powellite $\text{Ca}(\text{Mo},\text{WO}_4)$.

Birch Creek Deposits

The Beaverhead tungsten deposits situated nearest the population center of Dillon, and most accessible to the Union Pacific Railroad Company's line, which crosses the Birch Creek road at Apex, are the Silver Bar, Farlin Gulch, Lime Gulch, and Snowshoe.

One of the most promising of the Birch Creek deposits is the Snowshoe. This property is situated on Sheep Creek within 24 miles of Dillon and 10 miles by road from the Union Pacific railway. The portal of the 65-foot Snowshoe tunnel is entered from the northeast facing slope. Tactite beds dip with the topography, rather than into the hill, as is the case at Browne's Lake. Consequently, the mining of the powellite and other tungsten ores observed on this property should be undertaken with surface machinery, a mining method that reduces mine costs to a fraction of the cost of sub-surface mining.

Since this property was not recognized during the 1951 field season, its examination was conducted during the months of February and March 1952 by the author. At that time, overland treks were made about one mile up the snow-covered, slightly-inclined, north-facing bank of Birch Creek, to the point where its tributary, Sheep Creek, flows from the west off the northeastern slopes of the Humbolt Mountains. Snowshoes permitted travel on the upper portion of a four-foot blanket

of snow which covered the valleys but had been removed by wind from some of the more exposed ridges.

Exploration of this property and the Ivanhoe claim at Browne's Lake has been in progress during the winter of 1952 although all other Beaverhead tungsten properties, with the exception of the Lime Gulch, have been idle because their owners or operators did not wish to keep the roads open and failed to appreciate the fact that channel samples

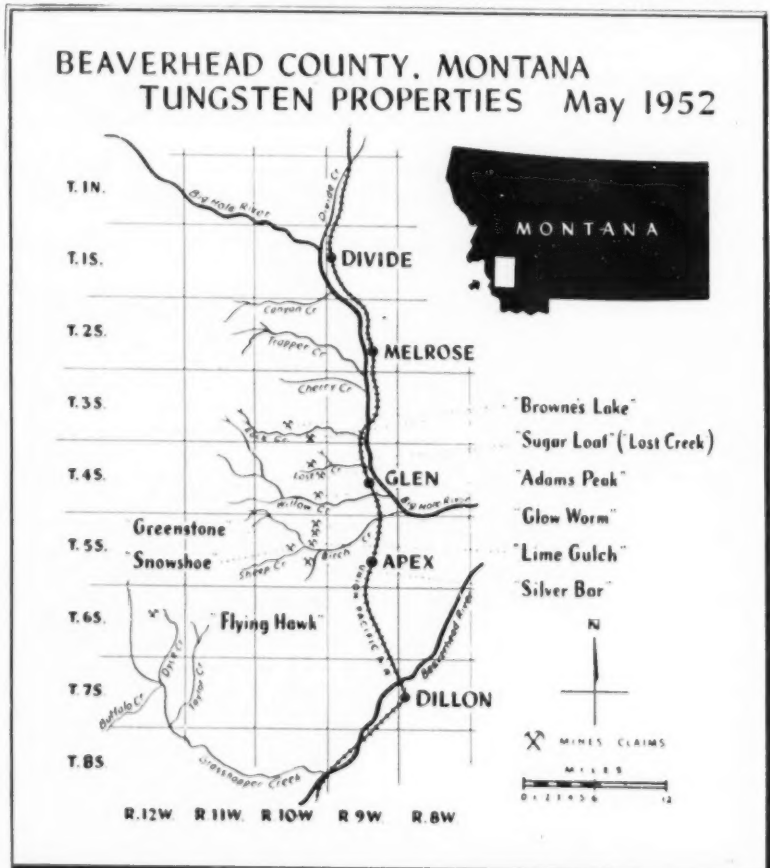
may be obtained from adits penetrating tactite ore bodies even though snow covers the surface of the formation's outcrops.

Browne's Lake and Sugarloaf

In 1907 Louis Stahl and A. A. Manser shipped a sample of ore to Germany taken from the area between Lost Creek and Twin Adams Peaks. There, Stahl's German relative obtained a positive test for tungsten by analysis of the sample. During July 1907, Stahl and Manser located two lode mining claims, which they called the Julia and Tungsten.

Twenty eight years later Roscoe C. McLaughlin, lessee of the old Ivanhoe copper mine six miles north of Lost Creek, suspected the presence of tungsten at the property and submitted a sample of ore for analysis. No tungsten was reported in this sample and seven years elapsed before any further tests were made for that metal.

In 1942, McLaughlin examined some Ivanhoe ore cached near the Browne's Lake, a mountain lake into which Agnes and Rock Creeks drain, named in honor of the owner of the first ranch in this area, J. A. Browne.



When the ore fluoresced with a golden color under ultra-violet rays, he extended his examination to the outcrops of tactite on the banks of Rock Creek and in the adits of old copper mines in Rock Creek Canyon. Organizing the Fluorescent Mines, Inc., McLaughlin and his associates located 17 claims, two on the south side of Rock Creek Canyon adjacent to the Ivanhoe claim and 15 on the north side of this canyon.

In September 1942, John Potts, president of the Galigher Company, of Salt Lake City, Utah, leased this powellite. Because of Hoffman's ill there is no record of ore shipments during the term of his lease.

A limited amount of bulldozing was done by the U. S. Bureau of Mines at that time on a claim situated on the north side of the canyon called the Garnet lode mining claim, which was one of the claims owned by the Fluorescent Mines, Inc.

Coincident with the McLaughlin discovery on the slopes of Rock Creek Canyon, Louis Hoffman and Robert Fleming relocated the claims of Stahl and Manser, adding claims north of Lost Creek on which they found evidence of scheelite and powellite. Because of Hoffman's ill health and Fleming's entry into the Army a few months later, these claims were abandoned.

By 1944 the Fluorescent Mines, Inc., operated a jaw crusher, ball mill, and two Wilfley tables near the Garnet adit on the north side of Rock Creek Canyon. McLaughlin screened the ore from the Garnet finer than 12-mesh. After tabling, he collected a concentrate averaging 26 percent WO_3 , for which he realized \$80.00 on a 300-pound shipment freighted to Salt Lake City. The Wah Chang Trading Company purchased this first shipment of tungsten concentrate from Beaverhead County. McLaughlin has stored in Dillon, Montana, approximately 300 pounds of concentrate he reports will average 40 percent WO_3 . This was a product of the Garnet mill processing of 30 tons of Garnet ore.

Attracted by the favorable summer climate of the Browne's Lake fishing resort and the interesting geology of Rock Creek Canyon, the geological engineer, Walter E. Bauer, of Keetley, Utah, in 1946 commenced a study of the attitude and age of the formations in Rock Creek Canyon. This covered a period of several summers. E. L. Cleveland, president of the Gold Corporation of America, Reno, Nevada, attracted by Bauer's work, leased the Fluorescent group of claims in January 1951.

MAY, 1952



Inclined surface tram up the south slope of Rock Creek from the compressor level to the exploration adit level on American Alloy Metals, Inc.'s Ivanhoe claim.

American Alloy Formed

The first examination of the Browne's Lake tungsten deposits by a Defense Minerals Administration field team occurred during the latter part of May and in early June 1951. Examining personnel consisted of geologists from the United States Geological Survey and engineers of the U. S. Bureau of Mines. Two exploration loans were subsequently granted the company formed to develop the Browne's Lake tungsten property.

This company, American Alloy Metals, Inc., is headed by two consulting engineers: Frank Eichelberger, of Eichelberger & Associates, Spokane, Washington, and E. A. Julian, of Goldfield Consolidated Mines Company, Reno, Nevada. The principal exploration of the Browne's Lake property in 1951 consisted of the drilling of eight holes by the Spokane, Washington, core drill contractor, Mc Clintock. These holes were drilled from surface stations located not more than 200 feet south of the tactite outcrops of the Amsden formation, a Paleozoic limestone which dips into the south bank of the Rock Creek Canyon.

During the late autumn of 1951 the USGS geologist, W. Bradley

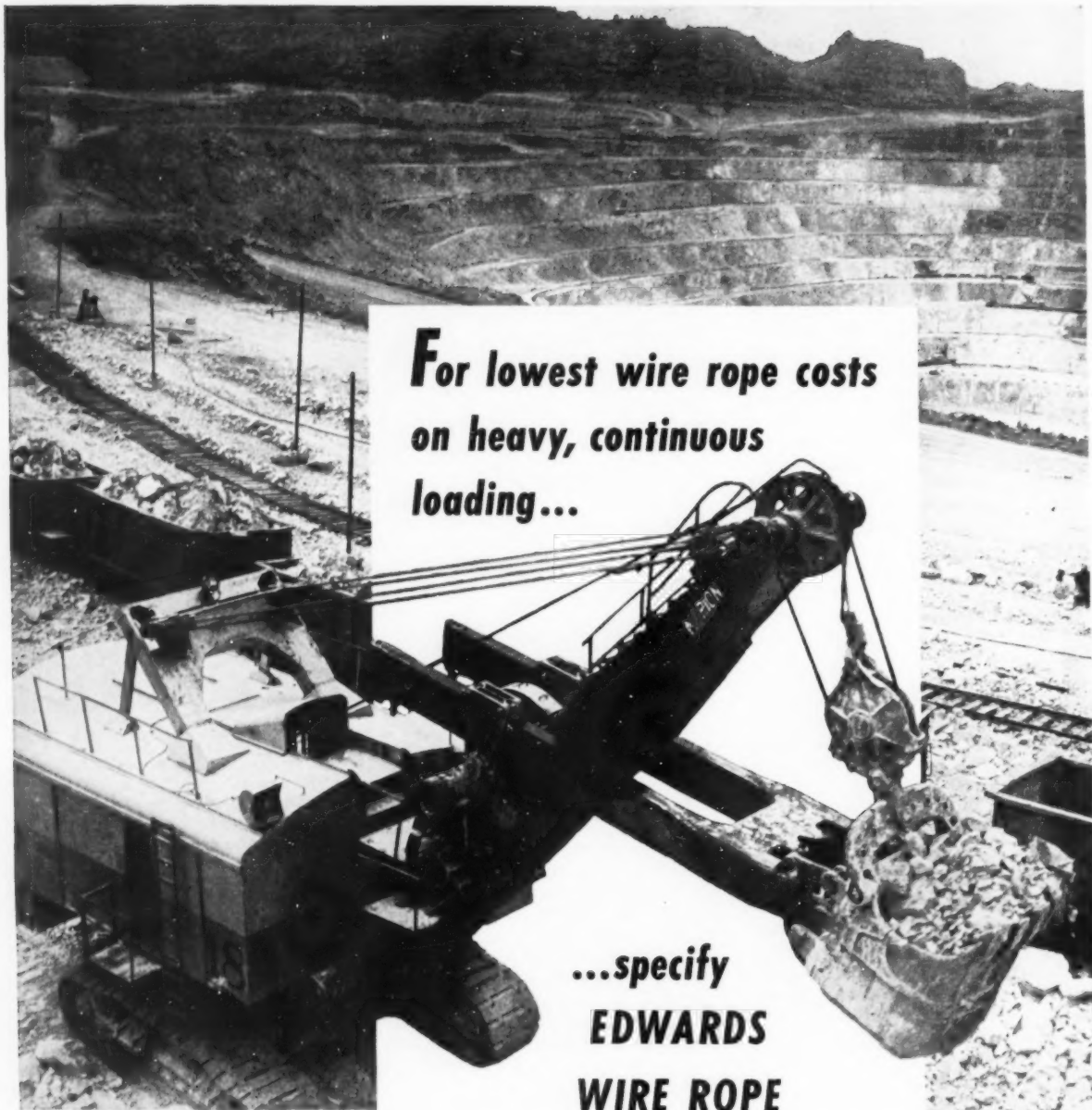
Myers, planetabled within Rock Creek Canyon. Myers' years of study of one of the quarter quadrangles in Beaverhead County is worthy of the highest recognition and may well result in one of the most accurate geologic maps of the decade.

Exploration Through Winter

On January 29, 1952, Robert N. Roby, project manager for the American Alloy Metals, Inc., with a skeleton labor force, started construction of a compressor house and inclined track leading from the compressor level to an adit whose portal is situated below the taconite outcrop. This horizontal adit pierces quartz monzonite of the south bank of Rock Creek throughout its length, a distance of 93 feet from the portal. Its extension should intersect the tactite ore body, because the observed dip of the tactite bedding, explored by adits, of an old copper mine driven into the mountain parallel with the dip of the bedding, is into the south bank of Rock Creek. All work this year has been limited to the Ivanhoe claim on the south slope of Rock Creek.

When the author visited this property in late March 1952, the com-

Continued on Page 94



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Mining, whether open pit, shaft or dredging, demands a lot from wire ropes. These demands have "set the specs" for the manufacture of Edwards Wire Ropes.

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Muriel Sibell Wolle Describes

SILVERTON IN SILVERY SAN JUAN

The most spectacular automobile road in Colorado is the Million Dollar Highway between Ouray and Silverton. The scenery is tremendous, the shelf on which one drives is a marvel of engineering, and the mines which line both sides of the highway have poured thousands of dollars into the San Juan area. According to the *Silverton Weekly Miner* of January 1, 1897, "God never made this country for farming purposes and man has, in that respect, never attempted to set aside the will of the Almighty. There is not a hill or a mountain in the whole county but what is gridironed with fissure veins of gold, silver, copper, lead or iron."

The little valley where the city of Silverton lies, is only a mile wide and less than two in length but it is watered by the Animas River, Cement Creek, and Mineral Creek; the mountains which surround it contain some of the richest mines in the region.

Even before the Brunot Treaty was signed with the Ute Indians in 1873, men like Baker and Howard had washed the stream beds and had tested samples of float; most of them had been driven off or killed by Indians. In 1871 and 1872, while the Treaty was being negotiated, impatient miners worked their way over Stony Pass and began staking claims. By the end of 1873, nearly 4,000 had been recorded and most of the big mines had been discovered. About \$15,000 was produced in the district that year, of which \$12,000 was from the Little Giant.

Real mining began in 1874. By 1875, the whole region was full of men working feverishly and building the towns of Howardsville, Eureka, Animas Forks, Mineral Point, and Silverton. The first water provided for the town was delivered in barrels which were hauled by a dog team on a wagon in summer and on a sled in winter. Pete Schneider, the owner, got his water from a spring at the base of Kendall Mountain and sold it for fifty cents a bucket. The first newspaper, *La Plata Miner*, was established in July 1875, and was edited by John R. Curry.

When the Denver and Rio Grande Western Railroad Company ex-

tended its rails in 1882 from Durango up Animas Canyon, through tortuous mountains, and along rock ledges to the growing city of Silverton, it provided a much-needed outlet for the increasing mineral production of the entire district. The first passenger train entered Silverton on July 3, 1882, and in honor of the event "a wild, hilarious time was enjoyed by the populace for several days."

Silverton expects to be isolated for intervals during the winter and spring by slides which close the passes, or bury the track of the "Rio Grande" in Animas Canyon, under tons of snow. In March 1906, snow fell for more than a week, during which time nearly every slide in the county ran, and the week's toll was 20 deaths. Thirteen men were lost when a slide destroyed the Shenandoah Mine's boarding house. Men from the mine wrapped the bodies in canvas, tied them on sleds made of two skis, and then dragged them for miles through deep snow over the very drifts made by the slide which killed them.

The Silver Lake Basin, 12 miles from Silverton, is high on Solomon Mountain and in it are many big mines all above 12,000 feet. One of the largest is the Silver Lake—a constant producer since 1886—its

gross production exceeding \$11,000,000. The company ignored the low-grade ore until 1890, when it built the first mill and began to produce concentrates. The mill operated all through the silver panic; in 1901 the property was purchased by the Guggenheims for \$250,000. Three months later the ore pinched, but the company continued to develop the property, using a full force of men. In December 1902, the mill started again, shipments of ore were again made, and by 1905 the Silver Lake had produced over 100,000 tons of crude ore and employed 350 men. Before 1902, the principal holdings of the company were the Silver Lake and New York City groups of mines. In 1902, the Titusville group, over the crest of Kendall Mountain from the Silver Lake and Iowa mines, was added.

In 1874, John J. Crooke purchased an interest in the North Star claim on King Solomon Mountain. He and his coowners did assessment work for that year, but as they did it "short," the mine was jumped. When Crooke, who still wanted the property, tried to buy it back from the new owners, he had to pay \$8,000 for it. During the winter, the ore collected on the mine dump, and to move it a toboggan sled was rigged

Continued on page 45

Approach to Silverton.



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DOWFROTH 250 has demonstrated better frothing characteristics in actual mill tests where concentrations as low as *one-fourth of normal concentrations* have proved satisfactory. Also, it produces a livelier froth on the machine which is quicker breaking in the launders and pump boxes.

This frother offers a good possibility of improved metallurgy by raising concentrate grade and mineral recovery. DOWFROTH 250 demonstrates little or no collecting power, permitting independent regulation of

frother and collector. Moreover, its water solubility permits the addition of DOWFROTH 250 as a water solution and assures return for reuse in mill water recovery systems.

DOWFROTH 250 requires practically no conditioning time and lends itself readily to stage addition. Adequate production facilities assure ready availability in both drum and tank car quantities.

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*Important facts
about pH for MINING & MILL
OPERATORS*

WHETHER you are building a new plant or modernizing present equipment, one of the most important advancements you can make is the installation of **BECKMAN pH CONTROL**. Throughout the mining industry—in gold, tin, tungsten, lead, zinc, copper and many other flotation operations—Beckman pH Control is proving to be the key to much higher recoveries, better control of processes, lower labor and chemical costs. Result—substantially greater profits per ton of ore. Some of the many benefits resulting from Beckman pH Control include . . .

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- opportunity for centralized or automatic, control of multiple flotation circuits.
- reduction of corrosion and scaling in pipe lines.
- improved or automatic, control of electrolytic operations.
- and many other vital savings in mining and mill operations—savings that will quickly pay for the installation, and will continue producing extra profits year after year!

For helpful details on mining applications, write to Data File 5-54.

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COMPLETELY AUTOMATIC! The Beckman Model R instrument operates directly from standard 110 v. A.C. lines to provide completely automatic pH indication. Also provides for completely automatic pH recording and automatic process control. Can be installed to give accurate pH readings from various stations in plant through one instrument. This is the pH unit being installed by today's most modern plants, large and small.



PORTABLE A.C. OPERATION! The Beckman Model H instrument can be quickly moved from one part of the plant to another and plugs directly into standard 110 v. A.C. current. Compact, convenient and extremely simple to operate, the Model H gives instant pH readings on an easily-read dial. Widely used both for manual pH control of small plants and as an auxiliary instrument on completely automatic pH installations.



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Beckman Instruments include: pH Meters and Electrodes—Spectrophotometers—Radioactivity Meters—Special Instruments

TO MAKE CERTAIN you get the latest, most convenient and most accurate pH equipment, be sure to specify "BECKMAN" . . .

* Beckman pH equipment is completely electrometric, eliminating the mess and inaccuracies of colorimetric methods. Simply press a button and the exact pH of any process is instantly shown on a large easily-read dial. It is the simplest of all pH methods!

* With Beckman equipment no time-wasting or troublesome sampling devices are needed. Beckman pH electrodes may be installed directly in vats, tanks, channels or flow lines—and exact pH values read instantly—and continuously, if desired—on the process fluids themselves.

* The accuracy of Beckman pH readings is completely unaffected by human errors in color judgment, by turbidity, oxidizing or reducing agents, by suspended materials, colored process solutions or other variables that affect outmoded colorimetric methods. Beckman pH readings are universally accurate and dependable!

* Unique rugged-type Beckman Electrodes, especially designed for direct immersion in abrasive or suspension-laden fluids, reduce maintenance to an absolute minimum. Beckman is the most trouble-free of all pH equipment!

The above are only a few of many Beckman advantages. Write for the complete story.

Silverton

Continued from page 41

up and run between the mine and the mill. Two thousand tons of ore were taken down the mountain on the sled.

The Shenandoah, the Dives, and the Mayflower claims date back to the early 1880's; but they were operated separately until the Shenandoah-Dives Mining Company was formed in 1929. The present holdings and leases of the company include many other properties—the North Star, the Terrible, the Slide, and the Silver Lake group. The present 700-ton selective flotation mill, is equipped with the most modern processes and machinery and employs more men than any other mine in the district. It is also a custom mill. The 10,000-foot-long aerial tramway delivers an endless line of buckets into the maw of the mill and returns with empty buckets, which bob along the cables till they seem to disappear up Arastra Gulch. On the south slope of King Solomon Mountain, at the far end of the gulch and so high on the sheer mountain-side that it seems pasted against the rock, is the main portal of the mine and the head end of the tram.

To handle the ore from so many mines meant reduction works and smelters and in 1875, Greene & Company blew in the first smelter, packing in the machinery on burros over Stony Pass before there were any roads. Consequently, the cost of each brick used for the furnace and stack was \$1.15. The smelter, which ran until 1881 when Greene removed it to Durango, was the first successful waterjacket type in Colorado.

In 1882, the Martha Rose smelter was built across from the brewery, at the base of Sultan Mountain, but it was unsuccessful and soon closed down. In 1894, Thomas Walsh opened a matte smelter at the old Martha Rose property, buying siliceous ore for flux wherever he could get it; in fact, it was while on a prospecting trip in search of such ore that he discovered the famous Camp Bird mine which made his fortune. His smelter handled a considerable portion of the ore of the region, especially that mined at Red Mountain.

A third smelter, built in 1893 by J. J. Crooke, is said to be the first in the United States which produced both gold and silver bullion. A fourth smelter, built by Kendrick and Gelder, was placed near the mouth of Cement Creek in 1900. In 1906, it became the Ross smelter and

opened a local market for quantities of pyritic and sulphide ores. In addition to the smelters, D. Duyckinck & Company and G. H. Stoiber ran sampling works near the railroad tracks. Today only dingy dumps mark the smelter sites for the buildings have long since been razed.

Silverton began as the heart of the Silvery San Juan, but by the time of the silver crash some gold had been found in certain properties and further developments revealed greater quantities of the precious metal. By 1897, half the mineral output was gold—silver, lead, and copper made up the rest—

and the region was renamed the Golden San Juan. During the 1890's great strides were also made in mining machinery and methods of production. Aerial tramways were built between the mines and all the bigger mills, and the day of the burro pack-train was over. No attempt to concentrate low-grade ore was made until 1890, but thereafter tremendous amounts of such ore were mined profitably.

"Silverton once had 3,000 people," said one of its leading citizens to me in 1948 when I last visited the city. "Now it has 1,500; yet we move more ore than we did when the 3,000 were in camp."

YES, you're seeing **DOUBLE**



In fact, when you watch Differential Air Dump Cars in action you're seeing double in several respects —

DOUBLE ACTION — they dump cars both ways, to left or to right. The 50° dumping angle assures a clean dump, and the massive air cylinders (two on each side) assure speedy, reliable dumping power. The double trunnion, double fulcrum design are key features in Differential's amazing performance.

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in Southern Iron Ore Mine



When the operators of a well-known southern iron ore mine switched to Du Pont "MS" (Millisecond)* Delay Electric Blasting Caps, they obtained greatly improved breakage. A typical example of the superior fragmentation is shown in the picture at the left. Loading machines like that shown below pick up the muck and transfer it to shuttle cars with a minimum of delay.

Better breakage naturally means increased production . . . cuts down costly secondary blasting. In addition, Du Pont "MS" Delay Caps reduce concussion . . . lessening damage to pillar walls and timbering. They also prevent cut-offs . . . assuring muck that is free from dynamite.

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More and more mine owners are finding Du Pont "MS" Delay Electric Blasting Caps an aid to more economical and efficient blasting. Why not try them in your own mining operations? Ask the Du Pont Explosives representative in your own area for complete information about these short-interval delay caps. He will be glad to help you with your blasting problems. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

*Available in 14 millisecond delay intervals MS-25, 50, -75, -100, -125, 150, -175, -200, -250, -300, -350, -400, -450, and -500.



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150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

ACTIVITIES OF U. S. MINING MEN

J. P. Caufield, general manager of Kennecott Copper Corporation's Utah Copper Division, has announced the promotions of five key officials. **L. F. Pett**, general superintendent of mines, was advanced to the position of general superintendent of operations, a post which has been unfilled since January 1950. **J. C. Landenberger, Jr.**, director of labor relations, was promoted to general superintendent of mines, succeeding Mr. Pett. **V. S. Barlow**, assistant mine superintendent, was named mine superintendent. **Joseph A. Norden, Jr.**, assistant general drilling and blasting foreman has moved up to succeed Mr. Landenberger. **James K. Richardson**, industrial engineer for Kennecott's Western Mining Division, became assistant to the general manager in charge of public, industrial, and labor relations.

Sam Adair and **Jack (B.E.) Neher** have joined the staff of the Ozark-Mahoning Mining Company near Cowdery, Colorado. Mr. Neher, who has been a shift boss at the Shenandoah Dives Mine in Colorado, will be a foreman, and Mr. Adair will be shift boss.

J. F. Myers has retired from his position as superintendent of concentration with the Tennessee Copper Company at Copperhill, Tennessee. **F. M. Lewis** will succeed to his position, and Mr. Myers will be retained in a consulting capacity.

John R. Matthews of Wallace, Idaho, has been promoted from chief accountant to secretary-treasurer of Hecla Mining Company to succeed L. J. Randall, recently elevated to the presidency. He has also been named treasurer of Polaris Mining Company, controlled by Hecla. **Elof Enbom** has succeeded Mr. Matthews as secretary of Polaris.

Robert P. Bell, assistant superintendent at Pickands, Mather & Company's Bennett mine at Keewatin, Minnesota, has been promoted to mine superintendent of the Cuyuna Range mines at Crosby, where **J. P. Schemmel**, formerly of Hibbing, is general superintendent. Mr. Bell succeeds **L. M. Becker** who has been made superintendent of the new West Hill mine, on the western Mesabi Range. **Edward Tyler**, engineer at the Wade mine at Kinney, replaces Mr. Bell. **R. J. Hawkinson** mining engineer, has been appointed chief engineer of Pickands' Hibbing district, and **Walter Thomte**, mining engineer at Bovey, has been promoted to assistant superintendent of the Danube mine, where **D. E. Coughlin** is superintendent.

Professor Clifton W. Livingston, head of the mining department at the Colorado School of Mines, has resigned to become president and director of research for the Mining Research Corporation. His resignation is effective May 31. The new corporation, which Professor Livingston helped to form, will work first with hydrometallurgy of uranium ores. The company is setting up a pilot plant at



SAM S. ARENTZ (left) has been advanced to manager of Nevada operations of the Combined Metals Reduction Company. He was promoted from general superintendent of the company's Pioche operations. **W. G. FIDLER** (right) has been promoted from Caselton mill superintendent to general superintendent of Nevada milling operations. Other promotions announced by Combined Metals are **C. E. Bartlett**, from assistant to the general manager to director of Utah and Nevada milling operations; **Paul Gemmill**, from geologist in charge of engineering at Pioche to general superintendent of mines; and **Frank H. Anderson**, from chief clerk at Pioche to office manager of Nevada operations.

Dove Creek, Colorado, and will use processes developed as a result of patents Professor Livingston holds.

Thomas P. Fahey has been appointed superintendent of the Arkansas Valley smelter of the American Smelting and Refining Company at Leadville, Colorado. He succeeds **Leo Hennebach** who retired.

M. G. McGrath, superintendent of Vitro Chemical Company's uranium mill at Salt Lake City, Utah, has resigned to take up work as a consultant in uranium mining and milling problems.

Arch Boyd, manager of mines for the Minerals Engineering Company, has been in Beaverhead county, Montana, supervising the obtaining of a metallurgical test sample of tungsten ore from the Greenstone group of claims.

Adolph Martz of Jones & Laughlin Steel Corporation's Minnesota Ore Division, has been made a pit foreman at the company's Columbia mine in Virginia.

Barney N. Dagan has been appointed assistant general superintendent of Kaiser Steel Corporation's Fontana, California steel plant; **Clarence R. Lohrey** is division superintendent of iron and steel; and **William G. Schulze** is superintendent of coke ovens and by-products.

W. G. Rouillard, plant manager of the American Smelting and Refining Company's plant at Garfield, Utah, has been elected president of the Utah Mining Association. He replaces **R. D. Bradford** who has been transferred to New York.

Paul A. Hodges is now working at the new open-pit copper mine which the American Smelting and Refining Company is opening at Silver Bell, Arizona. He had been working at the

Ground Hog mine of ASARCO in New Mexico.

O. M. Bishop, formerly with the Geological Survey and Water Resources of the State of Missouri, is now with the Base Metals Branch of the U.S. Bureau of Mines in Washington, D. C.

Thomas Hecker, a Michigan College of Mining and Technology graduate, recently joined the staff of the M.A. Hanna Company in the Iron River district of Michigan. Hanna company also announces the promotion of three men to be pit foremen: **Tony Rebrovich** at the Mississippi group, and **Ellsworth Holman** and **Bromley Williams** at the Carlz mine.

Arnold L. Brown has been transferred from the engineering department of Kennecott Copper Corporation at Ruth, Nevada. He is now in the production section as a foreman in the open-pit mine.

Eugene C. Anderson, of the State Bureau of Mines and Mineral Resources at Socorro, New Mexico, has been appointed by **Governor Mechem** of New Mexico to a six-year term as vice-chairman of the State Economic Development Commission. He is also representing New Mexico on the Water and Minerals Resources Committee of the Arkansas-White-Red River Basin studies being conducted by the InterAgency Committee of the Army Engineers and the U.S. Bureau of Reclamation.

L. C. Jones has been appointed chief engineer of the Utah copper division of Kennecott Copper Corporation, to succeed **George C. Earl** who has retired. Mr. Earl will remain as consulting engineer.



R. G. VERVAEKE of the U.S. Gypsum Company and **W. W. STALEY**, professor at the University of Idaho School of Mines, are collaborating on plans for student participation in the Northwest Metals and Minerals Conference to be held in Spokane, Washington, May 8, 9, and 10. This seven-state conference, sponsored by the Columbia Chapter of the AIME, will mark the fifth annual meeting of the Minerals Division and the first meeting of the Metals Branch in the Northwest. More than 35 technical papers will be presented in an extensive coverage of many problems and facets of the minerals and metallurgical world.

Obituaries

Harrison M. Lavender, 61, vice president of Phelps Dodge Corporation, died at his home in La Jolla, California March 21. He was a leading figure in Arizona's mining industry and had served as general manager of the Phelps Dodge metal branches from 1937 until he retired from that position March 1 of this year. It was under his direction that the corporation's huge Morenci open pit was brought into production, and the new reduction works at Ajo were erected. He also planned the development of the new lavender open-pit mine at Bisbee which was named in his honor. Following graduation from the Colorado School of Mines in 1916, Mr. Lavender served as mining engineer at various operations in Arizona, Utah, Colorado, and Mexico. In 1923, he joined the staff of the Calumet and Arizona Mining Company at Bisbee. When Calumet and Arizona merged with Phelps Dodge, he became superintendent of mines, Copper Queen Branch, and continued in that capacity until 1936 when he was transferred to Douglas as assistant to the vice president and general manager. He was appointed general manager of the corporation's metal branches in 1937, and in 1946 was named vice president and general manager.

Marion Dwight Harbaugh, 60, nationally known ore authority, died in Hudson, Ohio, March 19. Mr. Harbaugh had been named president of the Lake Superior Iron Ore Association the preceding November, succeeding Donald B. Gillies, retired, vice president of Republic Steel Corpora-

tion. Mr. Harbaugh had been vice president and secretary of the organization since 1936. Previously he had been secretary of the Tri-State Zinc and Lead Ore Producers Association of Picher, Oklahoma, for seven years. Mr. Harbaugh had entered engineering and geological work after teaching geology at the University of Wisconsin.

Dr. Maxwell Naylor Short, 63, head of the department of geology and mineralogy at the University of Arizona, died at his home in Tucson, Arizona, March 23. Dr. Short had attained nationwide fame in his professional field with the publication in 1940 of his treatise, "Microscopic Determination of Ore Minerals," printed by the U. S. Geological Survey. During his career, Dr. Short had been employed by various companies in California, Arizona, and Mexico, including Phelps Dodge Corporation, Calumet and Arizona Mining Company, Magma Copper Company, and Tecolotes Mining Company. He joined the faculty of the University of Arizona in 1931 as a professor of mineralogy and in 1948 became head of the department.

Leon Starmont, 64, veteran newspaper man and mining authority, died in Spokane Washington, on February 4. He had been editor of the mining and travel pages of the *Spokesman-Review* for the past eight years. His other newspaper and business affiliations included the *Grand Rapids Herald*, the *Detroit Free Press*, the *Minneapolis Tribune*, the *Chicago Examiner*, the *Grand Junction (Colorado) News*, the *Newspaper Enterprise Association*, and the *Seattle Star*. He was editor and part-owner of the *Spokane*

Press; editor and publisher of the *Spokane Mining Truth*, and one-time secretary of the Northwest Mining Association.

George H. Watson, 64, "mayor of romantic Alta," died in Alta, Utah, April 1. At the time of his death, Mr. Watson carried the honorary title of honorary mayor of the town he founded by donating 700 acres of land to the U. S. government. Mr. Watson's colorful mining career began when he came to Utah in 1902 from Houghton, Michigan. He eventually became president and general manager of the Alta United Mines Company.

Arthur E. Bendelari, 72, former president of The Eagle-Picher Company, died at his home outside Lexington, Kentucky on February 10. At the time of his death, he was director emeritus of the company. A mining engineer of international repute, Mr. Bendelari directed mining operations of The Picher Lead Company for several years prior to its merger in 1916 with The Eagle White Lead Company. He continued in the same position after the merger and was a key figure in the development of the Tri-State lead-zinc mining fields where Oklahoma, Missouri, and Kansas adjoin. He was elected president of The Eagle-Picher Company in 1929.

Henry Earl Giers, 77, well-known Utah mining executive, died in Salt Lake City in February. He had long been active as secretary and treasurer of the Leonora Mining and Milling Company, Little May Mining Company, East Antelope Mining Company, and in more recent years, Hydro Carbon Mining Company.

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ACTIVITIES OF INTERNATIONAL MINING MEN

MANGUM WEBB has been elected vice president of Chemical Construction Corporation. He joined the firm in 1914 when it was founded; served as Far Eastern representative in Shanghai, China, during 1935 and 1936; as procurement director during World War II; then became assistant sales manager and director of engineering of the Ion Exchange department of American Cyanamid Company, the parent firm. Mr. Webb has been sales manager of Chemical Construction since 1949.



Louis Lionel Colin has resigned after ten years as government metallurgist in Mozambique and is setting up private practice in Bulawayo, Southern Rhodesia.

Boris Ashurkoff is now a consulting mechanical engineer for the Nome Department, Alaskan Operations, of the United States Smelting, Refining and Mining Company.

Enrique Biel who has been with the MICA mining company in Argentina, is superintendent of Atok-Big Wedge Mining Company at Baguio in the Philippine Islands. **Constancio Tiglao**, acting superintendent, has been designated as assistant general superintendent.

Norman R. Jones has been appointed managing director of the Broken Hill Proprietary Company, Ltd. He had been chief general manager since March 1950 and is also managing director of Australian Iron and Steel Limited.

Charles Will Wright, internationally known mining engineer, has been in Mexico visiting several promising mining prospects which have been offered to the Mexican Mines Development Company (Impulsora Minera de Mexico).

G. A. Schnellmann, formerly a geologist with the Millon & Askam Hematite Iron Company in Egremont, Cumberland, England, has gone into private consulting work in High Wycombe, Bucks, England.

Guillermo Petzold, director of shop training at the School of Mines in Copiapo, Chile, was awarded a certificate of completion by the United States Department of Labor for training in the United States in which he participated in order to acquire technical knowledge for instructing future mine workers in his country. Mr. Petzold spent a year in the U. S. during which he traveled over 16,440 miles, visiting such places as the Colorado School of Mines, Kennecott Copper Company, U. S. Geneva Steel Company, Anaconda Copper Company, Homestake Mining Company, Lithium Corporation of America, South Dakota School of Mines & Technology, Miami Copper Company, and Inspiration Consolidated Copper Company.

Miro Mihelich has been appointed manager of Harbison-Walker Mineros, Ltd. in Brazil, a subsidiary of Harbison-Walker Refractories Company. Mr. Mihelich has been with Harbison-Walker since 1947, most of his time having been spent in the field of mineral exploration.

T. C. Fawcett, formerly manager of Donalda Mines Ltd. in Quebec, Canada, has been appointed manager of the Columbia Lead & Zinc Mines, Ltd. property in British Columbia, with **William Blair**, formerly of Leitch Gold Mines Limited, as his assistant.

Mauritz Ahlstrand is now work study chief of Foreningen Gruvarbetsstudiekontoret (Association of Mining Work Studies) at Blotberget, Sweden.

Cyril Knight, a consulting geologist in Toronto, Canada, is now located in Port Credit, Ontario, Canada.

P. B. Nye has been appointed director of the Commonwealth Bureau of Mineral Resources in Australia. He succeeds **Dr. Harold Raggatt** who was recently appointed secretary of the Department of National Development.

T. L. BLUNT (right) has been elected president of the Association of Mine Managers of the Transvaal, Inc., for 1952, and **A. J. CUNDILL** has been elected vice president. Mr. Blunt is associated with Grootvlei Proprietary Mines, Ltd., a large gold producer in the Springs district of the east Rand, Transvaal, South Africa. Mr. Cundill is with the Vlakfontein Gold Mining Company, Ltd. in the Brakpan mining district of the Transvaal.



Paul Shaffer, after 14 years experience in the Philippines as geologist with the Benguet Consolidated Mining Company and the Atok-Big Wedge Mining Company, both at Baguio, has become a general consulting geologist with headquarters in Manila. He has specialized in ore deposition and will continue to render services to the two above named companies where he is reported to have greatly increased the ore reserves during his exploratory work.

W. E. Sinclair, consulting mining engineer in Johannesburg, South Africa, has been making a professional visit to the Northern Transvaal and Nyasaland.

C. Edward Jacob, faculty member of the University of Utah, has accepted a six-month position with the Mutual Security Agency to serve as a consulting ground water geologist in Formosa. Following a short orientation course in Washington, D. C., he will fly to Taipei, Formosa. Mr. Jacob has had 16 years experience in ground water hydraulics with the United States Geological Survey.

Mauritz Ahlstrand, mining engineer, has been appointed Job Study Manager of the Foreningen Gruvarbetsstudiekontoret (Association for Job Studies in Mining) at Blotberget, Sweden.

Howard Steven Strouth, general manager of Cia. Minera y Beneficadora ANAHUAC, Mexico D. F., has just returned to the United States where he is a vice president of the Standard Mining Company in New York.

Robert D. Longyear, president of the E. J. Longyear Company, is on a three-month trip through Europe and Africa. Calls will be made at several important mining districts. On April 21-23, Mr. Longyear presented a paper on "Trends in Diamond Drilling in the United States of America" at the Diamond Drilling Symposium held under the auspices of the Chemical, Metallurgical and Mining Society of South Africa at Johannesburg.

William L. McDonald, one of the best known geologists in the Great Slave Lake area of the Northwest Territories of Canada, has been engaged by the Tungsten Corporation of Canada, Ltd. to thoroughly examine all underground workings at the Outpost Islands tungsten mine.

John H. Moses has left Peru after 16 years with Cerro de Pasco Corporation. During the last three years, he was their chief geologist. He is now with the Reynolds Mining Company at Little Rock, Arkansas, in the United States.

R. Pitman Hooper is general manager of The Zinc Corporation Ltd. and New Broken Hill Consolidated Ltd. property at Broken Hill, New South Wales. **J. W. Foots** has been appointed assistant general manager of production. He will be in charge of mining and milling operations. **W. S. Robinson** has resigned as president of the two firms.

P. H. Sevensma has been appointed senior mine geologist at the Sullivan mine at Kimberley for Consolidated Mining & Smelting Company of Trail, British Columbia. He is a graduate of the University of Geneva and worked for a French company for two years before going to Java for the Dienst Van den Mynbouw in Batavia.

M. Henri Depage, president of the Belgian Congo and the Ruanda-Urundi (mandated territories) tin producers, has been in Washington, D. C., negotiating with the Reconstruction Finance Corporation over the sale of tin from these areas.

Michael L. Haider, vice president of Imperial Oil Ltd. in Toronto, Canada, is president of the American Institute of Mining and Metallurgical Engineers. **O. B. J. Fraser**, assistant Manager of Development and Research for International Nickel Company, and **J. B. Morrow**, retired vice president of Pittsburgh Consolidated Coal Company, are vice presidents of AIME for this year.



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INTERNATIONAL NEWS

Second Quarter 1952 IMC Copper, Zinc Allocations

The governments of the 12 countries represented on the copper-lead-zinc committee of the International Materials Conference have issued their third consecutive quarterly allocation plan for copper and zinc. An additional 20,000 tons of zinc will be available for second quarter distribution according to member governments. Details of allocations are shown in the accompanying table.

Second Quarter Allocations

Country	Copper (Metric Tons)	Zinc
Argentina	2,050	2,900
Australia	12,150	14,500
Austria	2,900	2,100
Belgium-Luxembourg	19,600	26,500
Brazil	4,700	2,200
Canada	30,600	15,000
Chile	2,250	1,100
Cuba	50	20
Denmark	3,800	1,800
Egypt	1,300	400
Finland	2,400	1,200
Formosa	70	
France	36,900	31,500
French Africa	1,600	200
Germany, Federal Republic of	49,550	42,000
Greece	1,000	255
India	8,550	6,500
Indonesia	60	20
Ireland	50	100
Israel	100	100
Italy	23,800	10,500
Japan	16,000	13,000
Korea	120	
Mexico	3,400	3,900
Netherlands	6,800	6,000
New Zealand	80	400
Norway	4,000	3,600
Pakistan	1,650	300
Peru	200	300
Philippines		50
Portugal	600	300
Spain	4,800	4,700
Sudan	100	
Sweden	12,750	5,600
Switzerland	6,200	2,900
Trieste	200	
Turkey	1,450	300
Union of South Africa	4,850	5,000
United Kingdom	97,200	67,000
United States	355,600	235,800
Uruguay	100	100
Yugoslavia	4,100	2,000
Total	723,680	510,145

Producers Request Change In Australian Tin Price

The Australian Tin Producers' Association has asked the Federal Government for a long-range guaranteed price for tin and permission to sell at the world parity price. The world parity price is \$2,700 a ton, while the present Australian fixed price is \$2,250 a ton.

The secretary of the association said in Brisbane recently that tin production in Australia since 1941 had fallen from 3,500 tons to under 2,000 tons a year. This was largely responsible for the acute local shortage of tinsplate. Australia's canning industry is at present faced with this shortage. The secretary said that Australia needs 2,700 tons of tinsplate a year, and that this need would be increased by another 3,000 tons with the opening of tinsplate works at Port Kembla, New South Wales.

At Cockburn Creek near Tamworth in New South Wales, the oldest tin mine

in that state is reported to have closed down after more than a century of almost uninterrupted production. Tin output ranged from 40 tons a year before 1951 to 17 tons last season. The owner of the mine says that continued production would not pay at the present Australian price.

J&L Subsidiary To Explore For Iron Ore in Canada

The Jalore Mining Company, Limited, a subsidiary of Jones & Laughlin Steel Company, will start exploratory drilling for iron ore on the north shore of Lake Ontario, this summer. The company has acquired exploration options in four areas of southeastern Ontario, Canada—three near Peterborough, and the fourth in the vicinity of Kingston. Jalore is not certain that there is iron ore on these properties, but indications are good enough to warrant surface geophysical investigations.

DMPA To Buy Copper From Arizona Mine

An over-the-ceiling price will be paid by the Defense Materials Procurement Agency to Sam Knight Mining Lease, Inc. of Winkelman, Arizona, for more than 2,000,000 pounds of high-cost copper.

DMPA signed a two-year agreement with the company, promising to pay 31.6 cents a pound up to 2,390,000 pounds for electrolytic copper produced at the company's Christmas mine. Ceiling price is 24.2 cents on Arizona copper, f.o.b. refinery.

The agreement may be cancelled by either party with 60 days notice and will terminate automatically if copper is removed from price controls.

Cassiar Will Develop B.C. Asbestos Deposits

The Cassiar Asbestos Corporation of Toronto, Canada, is planning to build a new town in British Columbia's Cassiar district as a part of the development of its extensive asbestos deposits on Mc-Dame Creek, about 750 air miles from Vancouver and 65 miles southwest of Lower Post on the Alaska Highway.

The company, a subsidiary of Con-west Exploration Company, is planning to build two separate mills to produce commercial asbestos for world markets. One mill will handle 250 tons of raw material daily from higher grade and surface deposits. This unit may be in operation late in the fall. The second unit, to be finished later, will handle from 400 to 600 tons of normal grade asbestos daily.

The product will be shipped out on the White Pass & Yukon Railway to the coast and transported from Skagway by steamship.

The deposits of asbestos are on a mountain between the 5,000- and 6,000-

foot level. Preliminary buildings have already been built and an access road is nearly completed.

Penn-Cobalt Adds New Mill to Canadian Property

A new 300-ton mill will be constructed by Penn-Cobalt Silver Mines on its property in northern Ontario, Canada. The mill has been designed for expansion to 500 tons if ore developments warrant it.

Construction bids have been requested and it is hoped that production may start late this year. About \$400,000 will be spent on the surface plant, with another \$200,000 to be spent on underground preparation and mine equipment.

The company is also undertaking detailed exploration of the Kerr Lake mine—a one-time producer of 30,000,000 ounces of silver. The underground drill is now in readiness and the No. 7 vein is to be drilled first since this vein was the big producer. It is hoped that a considerable tonnage of cobalt ore will be found in depth. Mine manager J. H. Price reports that there are several other veins in the No. 13 shaft area.

Cobalt-Nickel Allocations by Countries through June

The International Materials Conference has announced distribution plans for cobalt for the first six months of 1952, and for nickel for the second quarter as shown in the table below.

IMC Allocations

Country	Cobalt ¹	Nickel ²
Argentina	5.0	22,046
Australia	22.0	334,438
Austria	36.0	385,805
Belgium-Luxembourg	52.0	224,869
Bolivia	0.2	441
Brazil	9.4	41,667
Canada	70.2	2,082,906
Chile	0.1	26,455
Colombia	0.2	3,307
Cuba	0.7	2,205
Denmark	8.5	39,683
Egypt	0.2	2,204
Finland	1.5	
France	185.7	3,802,935
Germany, Fed. Rep. of	265.7	2,744,286
Greece	0.2	2,204
India	5.0	211,642
Ireland	0.6	
Italy	31.6	562,173
Japan	67.7	321,651
Mexico	1.0	8,818
Netherlands	81.7	165,345
New Zealand	20.0	3,748
Norway	9.3	147,708
Pakistan		1,323
Philippines		441
Portugal	1.4	4,850
Southern Rhodesia	0.5	1,323
Spain	10.3	44,092
Sweden	80.0	1,440,927
Switzerland	15.0	296,739
Turkey	2.2	7,716
Union of South Africa	9.6	55,115
United Kingdom	648.1	11,741,038
United States	2,762.4	52,306,781
Uruguay		2,866
Yugoslavia	1.3	42,328
Reserve	7.8	
Total	4,413.1	77,082,075

1. Metric tons of metal content.
2. Pounds.



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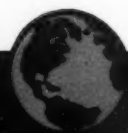
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INTERNATIONAL



AFRICA

NORTHERN RHODESIA—The supply of coal to the important copper mines of Northern Rhodesia is threatened by serious flood waters which may cut the vital railway link with Southern Rhodesia. The situation is considered so serious that the Northern Rhodesian government has requested the help of the Union of South Africa. The 1,500-foot road and rail bridge which is threatened by the Kafue River is also important to the Union because traffic to the Rhodesias and the Belgian Congo passes over it.

UGANDA—The value of Uganda's exports shows an increase in 1951 over 1950. Wolframite production is still in the hands of small workers, although several large companies have recently taken claims in the wolframite area of southwestern Uganda under exclusive prospecting licenses. The wolframite deposits are capable of much greater production than that currently being carried on and the government is bringing pressure on producers to improve their methods of production and to increase mechanization.

TANGANYIKA—Fraser and Chalmers, S. A., Ltd. is designing and purchasing equipment for a new HMS plant for *Williamson Diamond Ltd's. Shinyanga* diamond mine in Tanganyika. Wemco 48-inch densifiers will be used in the circuit. Williamson diamonds cannot be recovered by shake tables. In addition to the HMS plant, a separate electro-magnetic plant is being installed for test purposes. Open pitting of the diamond-bearing area, using heavy earth-moving equipment, has reached a depth of 15 to 20 feet.

KENYA—Gold production in Kenya is beginning to yield its pride of place to nonprecious minerals. Production of soda ash and salt have together been more valuable than gold for many years, but kyanite and its processed derivative mullite have now also equalled gold production in value. Some promising graphite occurrences have recently been brought to the development stage and considerable supplies of good quality asbestos (anthophyllite type) are in course of development. Diatomite production, mostly for local use, has expanded considerably.

SOUTH WEST AFRICA—Active prospecting and geological and magnetometric surveys are being continued both on the claims held by the *South African Minerals Corporation Limited* and on the area of about 350 square miles surrounding the claims and reserved by the South West African administration to convert the claims into "mining areas" as required under the state's mining laws. Construction of workshops, offices, and houses is expected to be completed soon. Machinery and equipment, including a large mechanical shovel, has arrived and is in operation. Other equipment, due to arrive soon, is expected to increase the production of manganese ore from the property. Production of high-grade manganese ore has now passed 2,000 long tons per month with a similar tonnage of low-grade ore being recovered for later shipment. Production is steadily increasing

each month with no difficulties being experienced in the transport of the ore both by road and rail.

ALGERIA—The *Cia Minera du Diebel Gustar* is building a 140-ton-day, differential, lead-zinc, flotation mill at Behagle, Algeria. Wemco equipment ordered through the *Ore and Chemical Corporation* will be used in the plant and includes 18, 36-inch Fagregren flotation machines, a 30-inch-diameter simplex classifier, and two 12 by 10 foot conditioners.

MOROCCO—In 1951, 1,740 tons of antimony were produced by a dozen small mines scattered through central Morocco. This compared with 1,220 tons in 1950. During the year, the *Societe Miniere de Rehamna (Rehamna Mining Company)* extracted 1,950 tons of iron pyrite against 1,470 tons in 1950. The country's mines produced 8,880 tons of smectic clay, compared with 5,670 tons in 1950; 3,260 tons of barite, compared with 4,900 tons; 890 tons of fluorspar, compared with 40 tons; and 2,500 tons of ochre, compared with 3,500 tons. Active investigations are being made for copper, tin, tungsten, gold, silver, beryl, and mica.

SOUTH AFRICA—The *Rex Diamond Mining Company Limited* has agreed to acquire the diamond mining rights of the farm Leeuwkop in the Winburg district. A shaft has been sunk 120 feet and at a depth of 70 feet a fissure was intersected which has been correlated as the Star fissure. A trial washing of 75 loads from this fissure yielded 21 carats equal to 26% carats per 100 loads. Production is expected to start soon.

FRENCH WEST AFRICA—In 1951, about 5,500 tons of ilmenite were extracted from the shore of Senegal and the shore of Casamance. By separation ilmenite (56 percent TiO_2) and zircon (60 to

62 percent ZrO_2) were produced. During the last few years, a dry concentrating plant for the production of tin was built at Air. The lack of water makes it necessary to utilize dry concentrating methods for the recovery of the cassiterite. In 1951, the production was about 90 tons of cassiterite as compared with 72 tons in the previous year. About 2,000 kg. of wolframite were also recovered from tin production.

UGANDA—The most important mining development seems to be that taking place in the *Kilembe* copper-cobalt mine in the foothills of the Ruwenzori Mountains. Several million tons of copper-cobalt ore have been proven by the operating company, *Kilembe Mines Limited*, which combines Canadian, British and United States capital. It has now been definitely decided to erect a production plant and the Uganda government has decided to extend the railway system westward from its present terminus to Lake George, in order to provide transportation for the mine. The railway extension will cost about £4,000,000. The Kilembe mine will have an initial milling rate of 3,400 tons of ore per day and the plant is designed to permit early expansion to 5,000 per day.

EGYPT—Egypt is planning to increase output of manganese ore and phosphate, both dollar-earning commodities. Manganese ore is in demand in the United States while Japan is interested in importing phosphate. Egypt's output of manganese ore rose from 80,000 in 1937 to 250,000 tons last year. Phosphate production increased from 40,000 tons to 500,000 tons over the same period.

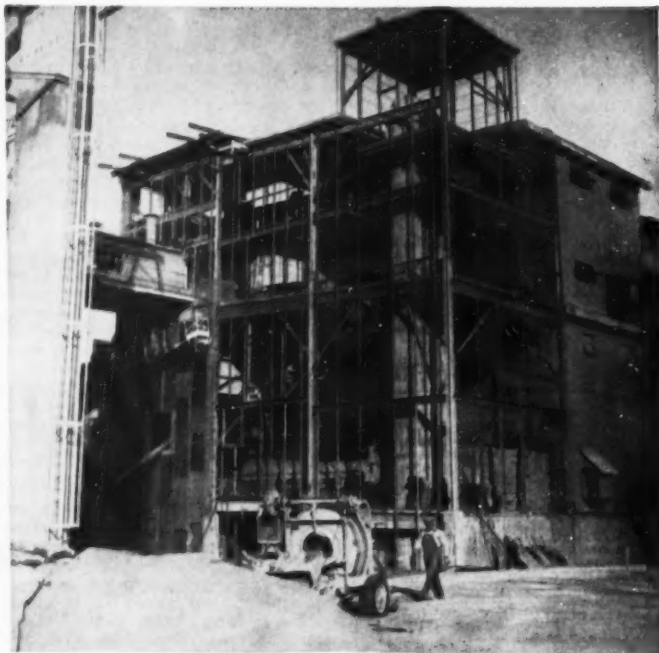
TRANSVAAL—The *Messina (Transvaal) Development Company* has acquired an exclusive prospecting reservation of 100 square miles of land surrounding the



WEST DRIEFONTEIN NOW PRODUCING

Pouring of the first gold bar produced at the new reduction works of the West Driefontein mine brought the number of producers in the West Witwatersrand area of South Africa to four—Venterpost, Elyvoortzicht, Libanon, and now West Driefontein. Proceeding way ahead of schedule, West Driefontein now has two units of the plant in operation. Its property adjoins that of Elyvoortzicht on the east, the world's richest gold mine. Attending ceremonies at the new smelter were Robert Annan, chairman of New Consolidated Gold Fields, Ltd., shown addressing the gathering; and, left to right, R. B. Smart, consulting engineer of New Consolidated; P. S. Hammond, a manager of the same company; S. B. Gibbs, manager of West Driefontein; E. S. Hallett, chairman of West Driefontein, and a manager of New Consolidated; and Dr. R. A. Pelletier, consulting geologist for New Consolidated.

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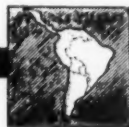
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210 Umkondo claims over which it holds an option. The old *Umkondo* copper mine, which is situated on these claims, about 140 miles east of Fort Victoria in Southern Rhodesia, is to be dewatered. Drilling is in progress to prove the extent of the deposit, in which an appreciable tonnage of high-grade ore is believed to exist. The general manager, in his annual report, said that the increase in ore reserve from 3,671,240 tons with a copper content of 2.07 percent, to 3,744,610 tons carrying 2.15 percent copper is gratifying because it was not possible to develop any new lower levels in the *Harper* and *Artonvilla* sections. Increased prices of supplies and commodities, and higher wages, raised costs by about eight percent from 26s. 11d. a long ton of ore produced to 29s. 1d. The cost per long ton of recoverable copper rose from £79 3s. 1d. to £84 1s. 11½d. Despite these higher costs, the net profit for the year, before taxes, was £1,441,188, against £844,672 for the eight previous months (equal to about £1,267,000 a year).



LATIN AMERICA

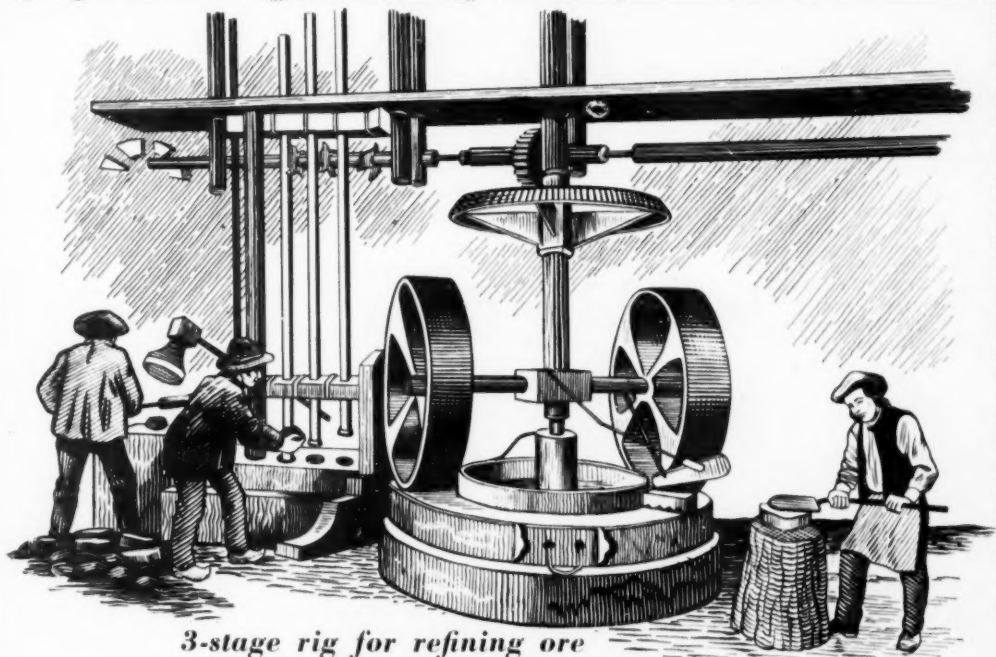
MEXICO—Reported discovery of two uranium deposits in Chihuahua, one at Placer de Guadalupe, the other at adjoining Puerto del Aire, is being checked by the National Institute for the Investigation of Mineral Resources.

PERU—*Compania Minera Milpo*, a newly formed mining company, has a new 80-ton flotation plant in operation. The properties, located at Milpo near *Cerro de Pasco* in the Atacocha region, will produce lead-zinc concentrates for shipment to United States markets. Present plans call for installation of a Sink-Float plant which will increase present production. *Aguiles Venegas F.* is general manager of the company; *L. Remy* is mine superintendent; and *Eugene Brown* is mill superintendent.

NICARAGUA—Ore reserve tonnages for *La Luz Mines Ltd.* at Siuna, Nicaragua, have again been revised downward showing an overall decrease of 1,256,716 tons compared with that at the end of the previous year. Average grade has been increased however and the tonnage of 8,941,000 indicates operation for another 12 years at the maximum capacity of the plant at 2,000 tons per day. Development work on the 750-foot level has added 869,300 tons of ore, and plans are being made to sink the shaft an additional 500 feet.

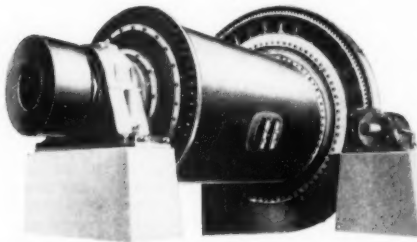
VENEZUELA—Orders for 560 gondola-type, 100-ton ore cars, and for 66 miscellaneous cars have been placed with the *Magor Car Export Corporation* by *Orinoco Mining Company* to transport iron ore in Venezuela. The company has also placed orders for nine 1,600-hp., 180-ton, road switcher-type, Diesel electric locomotives with the *Baldwin-Lima-Hamilton Corporation*, and also one 250-ton Diesel wrecking crane from *Industrial Brounhoist Corporation*.

VENEZUELA—A London industrialist is reported to have informed the *Venezuelan Mining Association* that he is interested in purchasing nonferrous metal ores from domestic Venezuelan firms. The mining association has advised all Venezuelan companies who have such ores



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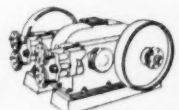
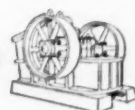
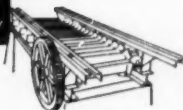
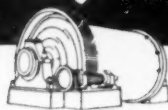
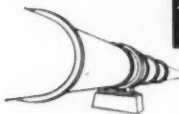
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INTERNATIONAL

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BRAZIL—*Volta Redonda*, Brazil's huge steel mill, and several other plants have been producing steel and pig iron at a surprising rate in an effort to keep up with increasing consumption. Present consumption of steel is almost 500,000 tons. In 1955, it will be 1,200,000 tons, while it is estimated to be 1,700,000 tons in 1960. The sharp increase is attributed to the use of more and more steel in the heavy industries—ship building, automobiles, trucks, oil, and mining. Brazil's big difficulty right now is the lack of good coking coal. *Volta Redonda*, for example, is mixing 35 percent of washed domestic

coal with 65 percent of imported United States coal. Plants in the interior of the state of Minas Gerais are still using charcoal.

COLOMBIA—Roberto Jaramilla Ferro, general manager of the Paz del Rio steel mill being constructed by *Empresa Siderurgica Nacional de Paz del Rio* at Belencito, reports that work is progressing satisfactorily. Machinery purchased largely in Europe is expected to arrive in Colombia soon.

PERU—*Compania Minera Runatullo* is expanding its concentration plant which will provide increased production of lead-zinc concentrates. The company was formerly a producer of molybdenum.

CHILE—A total of 12,952 tons of sulphur was exported during 1951. The countries purchasing the largest quantity were Argentina, Brazil, and Paraguay. These shipments represent an increase of 9,951 tons over the amount purchased during 1950.

MEXICO—Preparations are being completed to develop and mine a fluorspar deposit at Zacualapan, Guerrero. *Cia. Minas y Beneficios, S.A.* is the interested company.

BRAZIL—*Rio Doce Valley Company* plans to export at least 1,500,000 tons of iron ore this year, in line with its expansion program which aims at eventual export of 3,000,000 tons a year. Ore mined by the company is shipped about 550 kilometers from the mines to the port of Vitoria by rail, where mechanical loading apparatus places it aboard ship. About 80 percent of the company's exports go to the United States. Other customers include Canada, the Netherlands, Great Britain, Germany, and Belgium.

PERU—The *Negociacion Minera L.A. Proano* operates lead-zinc mines and a 150-ton mill in Tamboraque, 100 kilometers from Lima. It will expand its milling facilities to 250 tons a day by the addition of concentrating equipment which is being installed. Miguel Caro is the manager of the company and Alberto Bensus is mill superintendent.

VENEZUELA—More high-grade iron ore deposits are reported to have been located in the El Valle area, about five miles southeast of Caracas, according to reports from the *Orinoco Mining Company*. Preliminary studies are now being made on the area. Other iron deposits are also said to have been found near Valencia, in the state of Carabobo, in Central Venezuela.

BRAZIL—A tin refinery with a planned yearly production of 2,500 tons of metal is in the final stages of completion at Volta Redonda in the state of Rio de Janeiro. Brazil's annual consumption is about 1,800 tons, so 700 tons will be available for export.

SURINAM—Gold production in Surinam during 1951 amounted to nearly 202 kilograms, as compared with only 141.1 in the previous year. The greater part of the production came from the Lawa district.

MEXICO—*Cia. Fundidora de Fierro y Acero de Monterrey, S.A.* in Monterrey, Mexico's largest iron and steel works, is obtaining 2,000 more kilowatts of electricity from the *Mexican Light and Power Company, Ltd.* The increased power is to assist Fundidora in its greater production program.

BOLIVIA—The *Banco Minero de Bolivia* is negotiating with the *Export Import Bank* for a \$2,000,000 loan. The money would be used to increase the wolframite production in Bolivia and to install a plant to improve the grade of concentrates. Many of the concentrates are produced by small mines that do not have the proper facilities for making concentrates of sufficient grade to meet the requirements of buyers in the United States.

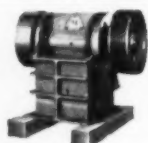
ARGENTINA—Considerable ingenuity was required to keep the *Aguilar* mine of *Cia. Minera Aguilar, S.A.*, a *St. Joseph Lead Company* subsidiary, in operation



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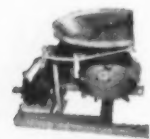
Denver Selective
Mineral Jigs



Denver SRL Pumps

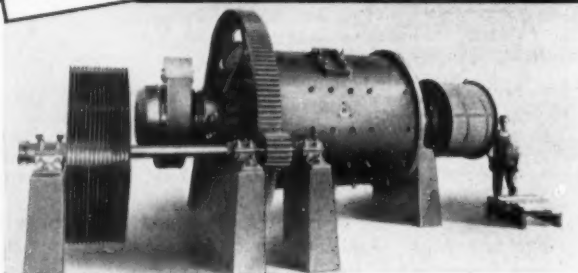


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last year, even at 70 percent of the installed capacity. The impossibility of obtaining sufficient permits for foreign exchange and the resultant lack of spare parts, mine and mill supplies, are having an adverse effect on this operation, as does the shortage of rail transportation. Unless steps are taken to rehabilitate the underground, milling, and plant equipment, and to complete development work long deferred by the lack of diamond drill bits, dynamite, and miscellaneous mine equipment, management believes that the Aguilar output will be further curtailed, with serious effect on the output of the sulphuric acid-fertilizer plant at Borghi, as well as the zinc smelter at Comodoro Rivadavia.

MEXICO—During 1951, *Cia. Minera Santa Maria del Oro, S.A.*, the Mexican subsidiary of *International Mining Corporation*, milled 165,123 dry metric tons of ore with an average grade of 11.60 grams of gold and 0.95 percent of copper per metric ton. Concentrates produced amounted to 9,422,439 dry metric tons, with an average metal content of 131.04 grams gold and 13.01 percent copper per metric ton. Bullion having a value of \$207,514.54 was also produced. Ore reserves at the end of the year were estimated at 1,409,561 dry metric tons, having an average grade of 11.77 grams gold and 0.95 percent copper. Development work during the year added to the ore reserves. Such work is being continued with a view to increasing the reserves further.

PERU—The program of diamond drilling on the *Toquepala* copper project of the *Northern Peru Mining and Smelting Company* in southern Peru was nearly completed by the end of 1951. A small amount of additional drilling will be required to delimit the orebody. Tentative ore reserve estimates indicate an economic deposit of large size, susceptible to mining by open-pit methods. No further work was carried on at the *Quelavaco* copper property located near *Toquepala*. A decision to place either project on an operating basis is dependent upon a detailed investigation of providing power, water, railroad, and port facilities. Encouraged by provisions of the new Peruvian Mining Code, further development was undertaken on a lead-silver-zinc property located at Chilete. Additional ore was discovered and it has been decided to place the property on an operating basis of about 7,000 tons of ore per month. All mill, power plant, and townsite construction is expected to be completed and operations will start late this year.

BOLIVIA—Negotiations have been resumed between the *Hochschild* concern and the Bolivian government to arrive at acceptable conditions for developing the huge and rich *Matilde* zinc deposits near Lake Titicaca. *Hochschild* wants to obtain certain guarantees that taxes, levies, percentages of free foreign currency, will not be changed once the company starts work. Development of the deposit was first started in 1927 and the total cost of development to date has been \$3,000,000. The mine is developed through a main adit 2½ kilometers in length which cuts the large *Santa Barbara* vein. Extensive engineering and geological surveys estimate that there are more than 3,000,000 tons of 17.9 percent zinc ore developed.

MAY, 1952



ITALY—Steel production of the *Finisider Group* was 1,273,000 tons in 1951 or 36 percent more than in 1950. Pig iron output reached 575,000 tons—more than doubling the previous year's production. The gains were possible through the rehabilitation of blast furnaces and steel plants. Production is expected to be

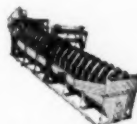
boosted further through new facilities in 1952, including the *Cornigliano* plant near Genoa. Total Italian production for 1951 was set at 3,049,000 tons for steel and 952,000 tons for pig iron.

NETHERLANDS—A bill has been submitted to Parliament to provide for the expenditure of F500,000 for exploration of nonbituminous minerals in the Netherlands. The chief aim of this bill is the search for anhydrite in order to make the country more independent from imports of sulphur and pyrite used in the manufacture of sulphuric acid.

WESTERN GERMANY—Smelter production in Western Germany made tremendous increase during 1951. Figures



Denver "Sub-A" Flotation



Denver Cross-Flow Classifiers



Denver Hydroclassifiers



Denver Super-Agitator and Conditioners

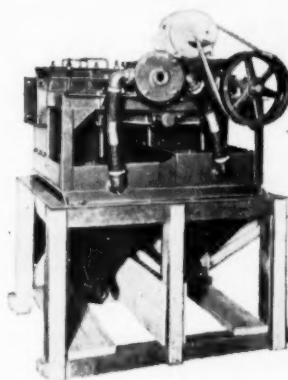
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in metric tons for the past two years are itemized in the table below.

Metals	1950	1951
Aluminum	27,836	74,134
Lead	141,519	149,680
Copper	196,443	204,848
Zinc	136,088	150,106
Tin	817	864
Tin Alloys	2,812	2,369
Solder	6,292	6,105
Pig Iron	9,473,000	10,697,000
Steel Ingots	12,121,000	13,506,000

HUNGARY—According to reports from Budapest, every week some 16 to 18 barges leave the Hungarian port of Komarom for the USSR. Each barge carries approximately 100 tons of bauxite. Nor-

mally, these barges sail for the Rumanian port of Ismail. The Hungarian crews are forbidden to carry cameras; at Ismail they are placed under quarantine on a Soviet hospital ship.

YUGOSLAVIA—Under a new trade agreement with Holland, Yugoslavia will export 1,000 tons of zinc concentrates, 300 tons of zinc ingots, and 1,000 tons of lead to the Netherlands. Yugoslavia's magnesite mine at Goles near Pristina is being equipped with a plant to permit the production of 50,000 tons of caustically roasted magnesite. Two new magnesite works will raise the total production even higher. The Magnochrom factory at Rankovicevo will be able to turn out 100,000 tons of fire brick annually.

At the Ljubija and Vares iron mines in Borsia, output is being increased to 1,500,000 tons in 1952. Iron ore reserves in Bosnia-Herzegovina are estimated at 130,000,000 tons.

EAST GERMANY—The construction of the first zinc smelter in East Germany is reported to have started. The site is on the eastern edge of Freiberg and will be connected to Freiberg-Ost station by a branch line.

ENGLAND—For some time *Geavor Tin Mines, Ltd.*'s vein has been changing in character and showing more copper. It is becoming increasingly like the typical ore body in *Levant* mine which adjoins Geavor, and there is a possibility that the Levant ore extends into Geavor ground. Development footage has increased slightly, and it is understood that a new electric hoist and steel headframe have been ordered. A new shaft may be needed soon because of considerable lateral development.

SPAIN—The majority of Spain's iron and steel works are in the process of being renovated. Millions of pesetas are being invested in this rehabilitation program and it is expected that a superior grade of steel will be offered to the Spanish market, provided normal conditions prevail for the next few years, and provided that imports of charcoal and coke may continue.

FRANCE—A new firm has been organized to study the treatment of gold ore by the regular methods and by some new techniques which have been perfected. The company will be known as *Cie Francaise de Metallurgie Aurifere (CIMA)* and has a capital of 2,000,000 francs. The company is setting up a laboratory at Versailles for preliminary experiments and analyses of samples.

AUSTRIA—*Bleiberg Mining Company* opened up several mines in Styria during 1951. Zinc and lead prospecting were resumed in the Styrian mining district between Arzwaldgraben and Frohnlaiten. 5,000 tons of lead and zinc ore were mined at Nassereith, Tyrol, without any new investments.

EAST GERMANY—An underground flood has virtually closed one of the biggest copper mines in East Germany. The *Fitstumm* shaft near Eisleben and the adjoining *Paul* shaft were affected. The floods were unmanageable because of the lack of pumping machinery which had been confiscated by the Russians.

ENGLAND—In Weardale, Durham county, a lead-fluorspar district once abounding in small lead mines, there is a slight increase in activity. In the lower part of the Wear Valley, *Fluorspar Ltd.*, which runs the *Stanhopeburn* mine, is reopening and sinking on the *Wager Burn* lead lode. The lode is said to be quite good. Further up the valley is the *Stanhopeburn* which has been working fluorspar for some years. In the past year, remodeling of the plant had been completed and it is now producing high-grade acid spar. At *Rookope*, the *Weardale Lead Company's* mine has done fairly well and the shaft has been deepened. A new prospect has been started by *Fluorspar Ltd.* on the *Slitt* vein at *Billing Hills*. Some years ago this vein was worked by the *Billing Ganister Company*. Still further north toward the head of the valley, *Blackdene* mine is being reopened



two tons
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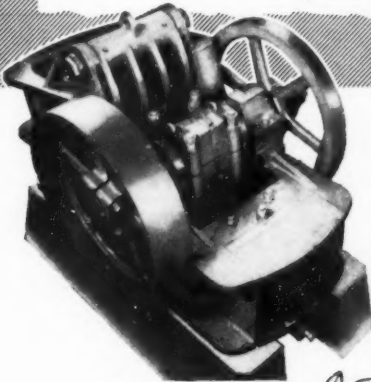
Full information on request.





breaking copper "hot cakes"

Even for this early method of processing, tools were made to exact specifications: "The head of the hammer must be three palms long and one wide, and sharpened at both ends, and its handle is of wood three 'feet' long".



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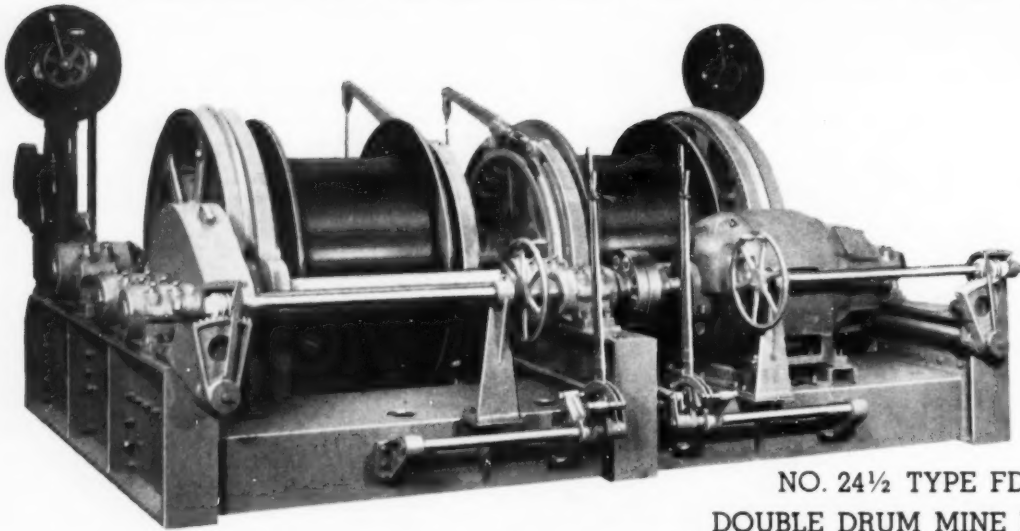


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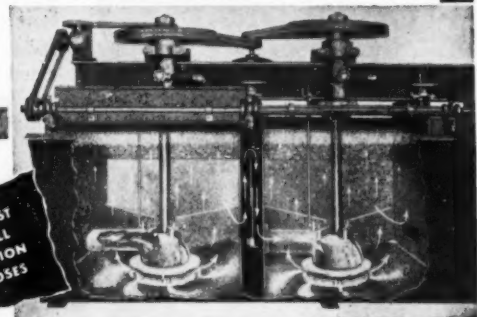
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associated with active mining enterprises
throughout the world.

by *United Steel Companies*. A winze has
been sunk 150 feet below the bottom
level exposing a good fluorspar lode.
Other lead and fluorspar mines being re-
opened are *Coalcleugh Swinhope* and
Tynehead which are situated still further
north on the borders of Northumberland,
Durham, and Cumberland. They are be-
ing reopened by the *Allendale Metallif-
erous Mining Company, Ltd.*

ITALY—In the province of Grosseto
north of Rome, antimony deposits have
been found which may ensure a monthly
output of 2,000 tons for a period of 20
years. Ore production from this province
during 1951 was as follows: antimony,
11,500 tons; manganese-iron 2,200 tons;
iron pyrite 79,427 tons; quicksilver, 8,500
tons; lignite 19,012 tons.

CZECHOSLOVAKIA—In the zone of
Pardubice, an extensive deposit of iron
ore is being developed by the *Skoda
Company*, the capital of which is in the
hands of the Czechoslovakian govern-
ment. The deposit is reported to have an
output potential of 1,000,000 tons for the
20 years.

RUMANIA—Uranium ore resources in
the zone of Gheorgheni have been dis-
closed by the officials of Rumania's min-
ing department. It is estimated that an
output of 8,500 tons of uranium ore
could be guaranteed for a period of from
10 to 15 years.

ITALY—The *Monteponi Company* an-
nounces that it has discovered new zinc
deposits in the province of Nuoro in
Sardinia. The company has also pur-
chased new equipment for its Vado
Ligure smelting plant in Savona to en-
sure a larger output of zinc.

MAY, 1952



PHILIPPINE ISLANDS—*General Base
Metal, Inc.*, which was the biggest pro-
ducer of manganese in 1951, is expected
to produce more tonnage and a higher
grade of manganese in 1952. A new
washing plant is now being erected and
the firm plans to construct a road from
Guidulman to the mine which would
shorten the distance which is presently
traveled on the government's road via
Anda to the mine.

TASMANIA—*North Broken Hill, Ltd.*
and *Broken Hill South Ltd.* are jointly
engaged in exploring and developing the
Oceania mine in the Zeehan silver-lead-
zinc field. The main shaft has reached a
depth of 344 feet. Development work on
the 150 and 300-foot levels, together with
diamond drilling, indicates continuity of
the narrow lodes for about 300 feet along
the strike and to a depth of about 500
feet. Possible extension of ore 600 feet
to the north remains to be explored, when
a decision can be made as to the scale of
operations.

NEW GUINEA—*New Guinea Gold-
fields Ltd.* is operating the concentrating
section of its new Golden Ridges mill at
Wau. Recovery has been about 60 per-
cent, but it is expected to improve as
techniques are developed. A Krangle jig
may be installed for fine gold recovery.
The operating plant consists of 20 stamps,
amalgamating tables, classifiers, corduroy
strakes, Hardinge ball mill, and two cor-
duroy tables. Concentrates are amalga-
mated in a barrel.

TASMANIA—*Montana Silver Lead
N. L.* at Zeehan expects to start operat-
ing a selective flotation plant for the re-
covery of zinc as well as silver-lead in June.
This company has granted an option to
the Australian subsidiary of *Copper and
Alloys, Ltd.* It is proposed to recover
both nickel and copper from the ore, a
sample of which is being tested in Great
Britain.

PHILIPPINE ISLANDS—*San Mauri-
cio Mining Company's* mill has started
production and is operating at full
monthly capacity of 10,000 tons. San
Mauricio has opened a new vein split on
the Sta. Inas vein, which has averaged
for a 315-foot length 54.60 pesos in
value per ton. In the *United Paracale
mine* operated by *United Paracale Min-
ing Company*, the Longos section has
been unwatered to the 300-foot level
where permanent station pumps are be-
ing installed. Pumping will continue to
the 400- and 500-foot levels, requiring
the use of two large 250-hp. sinking
pumps handling up to 4,000 gallons of
water per minute. Production should
start this month.

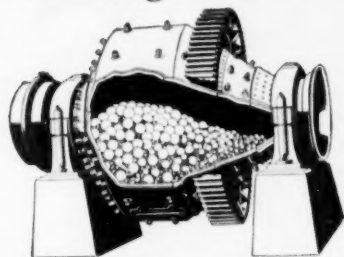
NEW GUINEA—*Mandated Alluvials
N.L.* is investigating Fluo-Solids roast-
ing of its gold copper sulphides. Known
ore reserves are 300,000 tons assaying
4.0 percent copper, 3 dwt. gold, and 42
percent sulphur, with 1,000,000 tons pos-
sible.

SOUTH AUSTRALIA—Geologists are

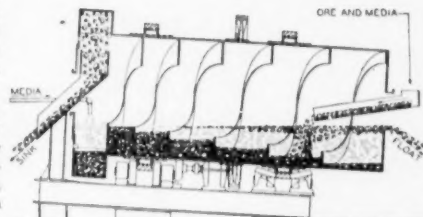
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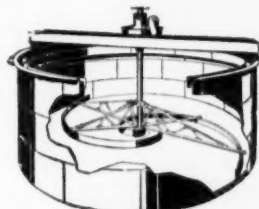
Hardinge has it!



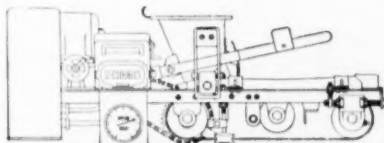
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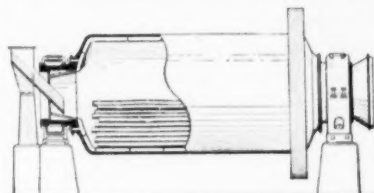
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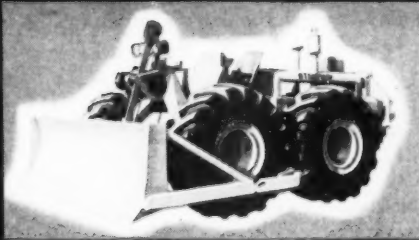
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- 7 Accurate grading**—smooth, perfect balance of torque against load gives accurate control of blade at all times.
- 8 Single-stage torque converter**—simple and trouble-free . . . not dependent on seal efficiency for converter efficiency.
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- 10 More yards per hour**—use of maximum engine horsepower gives higher average speed, higher ratio of operating efficiency, more work done.

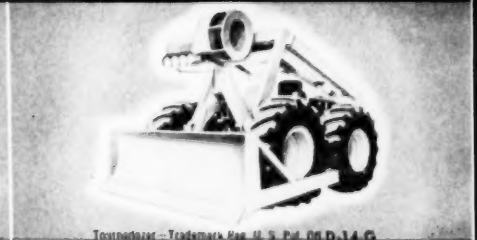
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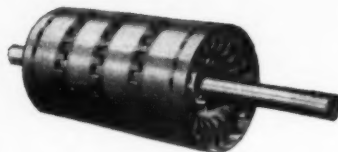
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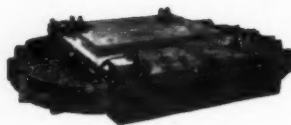


recommended where burden depths do not exceed 3". Within this range, these are the magnets to use because of their unsurpassed concentration of magnetic strength near the surface. Catalog C-1007A.

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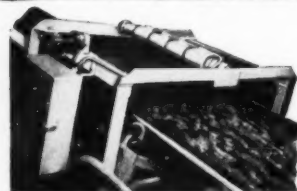


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DINGS MAGNETIC SEPARATOR CO.

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INTERNATIONAL

News

Continued from page 61

tracing copper lodes in the Burra district, to see whether it would be worthwhile to reopen mines there. The Burra copper mine was one of the earliest and richest in the state. Up to 1877, it yielded \$20,000,000 worth of ore. The present search has been in progress for some time and will likely continue so that the possibilities of the area may be tabulated and assessed. Officers of the Mines Department are undertaking a geophysical survey of the district.

INDONESIA—Japanese interest in the mineral resources of Indonesia has been revived. A new company has been established in Kobe, Japan, the *Indonesia General Mining Corporation*, with Indonesian status. The capital will be 80 percent Indonesian and 20 percent Japanese. Plans are to investigate for asbestos in Halmahera and for manganese in South Borneo.

NEW ZEALAND—*Kanieri Gold Dredging Ltd.* reports that its property is almost exhausted. It is now acquiring the leases of *Taramakau Gold Dredging Ltd.*, which has an estimated life of 15 years and a margin of profit of £1,200,000.

PHILIPPINE ISLANDS—With *Acoje Mining Company's* new 1,000-ton-daily-capacity concentrating plant and with the development of a new high-grade metallurgical chromite ore body by *Luzon Stevedoring Company* in Lourdes, Oriental Misamis, metallurgical chromite export will be greatly increased in 1952. Present demands for refractory chromite are greater than in previous years. *Benguet Consolidated Mining Company* is now making plans for a better haulage system of chromite from the mine to their wharf at Masinloc, which would increase production.

NEW GUINEA—*Bulolo Gold Dredging, Ltd.'s* deep-digging Number Five Dredge is back in operation after being completely rehabilitated. For the nine months ended February 28th, 8,015,520 yards were dredged, producing 56,299 ounces of fine gold, valued at \$1,970,465.

NEW SOUTH WALES—*Tungsten Consolidated, Ltd.'s* plant at the *Frogmore* mine will begin crushing operations shortly. The output is expected to be about 200 tons a week, giving a production of six tons of concentrates assaying 66 percent, WO₃. Six of the 12 magnetic anomalies at Rye Park have been drilled, which, with nine holes in the area, show tungsten values indicating an extensive ore body. Results have been encouraging enough to continue diamond drilling.

VICTORIA—*Victoria Antimony Mines, Ltd.* has been formed to acquire the *South Costerfield Antimony & Gold Mining Company, Ltd.* and leases held by the J. Casby syndicate. Equipment is already being shipped to build a new concentrator.

NORTHERN TERRITORY—*Falcon Gold Mines N.L.* is erecting a crushing plant and treatment plant on its leases at Mosquito Creek. The main shaft has been sunk to a depth of 85 feet and scheelite and wolframite ore have been exposed.

QUEENSLAND—The new 329-foot

stack for the new copper smelter *Mt. Isa Mines Ltd.* is building has been completed. The plant will have a peak capacity of 18,000 tons of copper per year, limited only by shaft capacity. Lead and copper ore will be hauled through the same shaft which has a capacity of 90,000 tons per month.

AUSTRALIA—The *Fifth Empire Mining and Metallurgical Congress* will be held in Australia and New Zealand during April and May of 1953. The inaugural meeting and other official functions, along with technical sessions, will be held in Melbourne. There will be visits to Sydney, Canberra, Tasmania, and numerous properties in New South Wales, South Australia, Queensland, and Western Australia. All communications should be addressed to the secretary at Osborne House, 399 Little Collins Street, Melbourne, Victoria, Australia.

WESTERN AUSTRALIA—*Coobina Chrome Ltd.* has been formed in Perth to develop a chrome deposit. The new company's property is at Coobina, north of Meekatharra in the Peak Hill gold field area. Its nominal capital is £250,000. Also in Western Australia, *Amalgamated Tin Ltd.* has acquired a number of claims and options totaling 2,865 acres, together with a quantity of machinery and equipment; and *Broken Hill Proprietary Ltd.* has pegged three gold mining leases at Higginsville, 90 miles south of Kalgoorlie, in the heart of the local scheelite area. Higginsville is producing both gold and scheelite. The company is entitled to work any minerals it may find on gold mining leases. Some months ago, the company suspended old mining operations on the *Hannans North* mine because ore reserves had cut out.

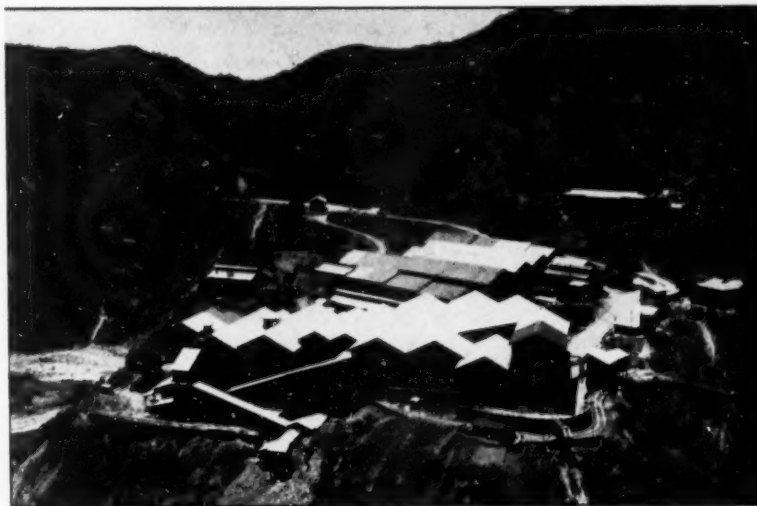


TURKEY—*Bilgin Maden Ltd.* exported 22,275 tons of chrome ore in 1951. This figure is expected to reach 30,000 tons in 1952.

MALAYA—As soon as terrorist activities subside in Malaya, *Consolidated Tin Dredging Company, Ltd.* of Melbourne, Australia, plans to undertake an active prospecting campaign in that country. A. W. Palfreyman, chairman of the firm, reports that a number of properties have been offered to the company, several of which would be worth acquiring. Some of the company's dredges are idle and would be moved to the most suitable properties, whether in Malaya or Siam. Cost of removing and reassembling was formerly £A 10,000, but today it is estimated to amount to about eight times that figure.

JAPAN—Iron ore imports for 1952 are scheduled to be about 4,900,000 metric tons. The Iron and Steel Bureau of Japan's Ministry of International Trade and Industry says that the sources would be as follows: U.S.A. 2,450,000 metric tons; Philippines 1,000,000; Malaya 800,000; Hong Kong 300,000; Goa 250,000; India 100,000.

MALAYA—The Federal Legislative Council has increased the tax on tin exported from Malaya in order to finance a bureau in the United States which would publicize the Malayan tin industry. The levy is an additional 50 cents (Straits) per picul which brings the total tax up to 80 cents per picul. Chinese tin



BENGUET-BALATOC PLANT EXPANDING

Benguet Consolidated Mining Company is adding another 400-ton complete treating unit to its Benguet-Balatoc, all-slime, cyanide plant (above) which will raise its capacity to 3,000 tons per day by July 1. The ultimate capacity is to be 4,000 tons per day. Before the war, Benguet operated its own mill at Antamok, and also the near-by mill of Balatoc Mining Company on a 50-50 basis. Since both mills were demolished during the war, it was decided to erect a joint mill at Balatoc. Joseph S. Peterson is vice president and general manager, while Ralph W. Crosby is general superintendent.



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MINING WORLD

INTERNATIONAL

mines operating in the state of Perak were seriously affected by the lower tin prices of last year. Individual production figures show that some 130 of the 414 Chinese mines operating in that state were not operating on a profit-making basis. While all of the mines have been affected by the emergency, Chinese mines have suffered losses of personnel and serious damage to machinery and other equipment which could not easily be replaced.

TURKEY—The government has granted a license to a German ceramics firm to export alabaster, rich deposits of which are located in central Anatolia. The government has also accepted tenders of a United States firm to buy 100,000 tons of chrome.

JAPAN—A pilot plant to produce titanium which has been under construction for some time is now in operation. *Osaka Tokushu Seitetsu K.K. (Osaka Special Steel Company, Ltd.)* is the operator.

TURKEY—British Thomson-Houston engineers have recently installed one of the most extensive underground lighting systems in the world in the *Eregli* coal mines. The installation consists of more than 700 flame-proof underground mining units and 3,500 flame-proof fluorescent lighting fixtures. The BTH engineers encountered many problems because the Turkish miners had very little knowledge of electronics or mechanics and only one item of equipment (500 volts) was in the mine when they arrived.

INDIA—To meet the demand for 2,000 tons of gypsum for *Sindri Fertilizer and Chemicals Ltd.*, a contract has been arranged with *Jamsar Mines* of Bikaner. The company will supply 1,000 tons of gypsum a day. Arrangements are also being made to stockpile 100,000 tons of gypsum at the quarry. In Jodpur, certain mines are being developed to produce another 1,000 tons per day of gypsum. Arrangements are also being made with the railway for the construction of a transfer station from meter gauge to broad gauge at Agra, in order to handle supplies from Bikaner and Jodpur. The present reserve of 85,500,000 tons of gypsum is sufficient to meet Sindri's requirements for decades.

PAKISTAN—It is reported that a tentative agreement has been reached on an aerial photographic and geological survey of Pakistan to be undertaken by a Canadian firm. The survey would provide basic data of immediate long-term value to Pakistan in carrying out its economic development.

INDIA—The Development Department of Sikkim State has reported the occurrence of limestone suitable for manufacturing lime and cement. The deposit is in the Rangit Valley in South Sikkim, bordering the Darjeeling district of West Bengal. A coal belt about 100 square miles in area has been discovered and members of the Indian Geological Survey have been invited to investigate the area.

INDIA—The Government of India has appointed a committee to make recommendations regarding the establishment of a cement-sulphur industry in India, using Indian raw materials. The Indian-Chemical Manufacturers Association are also tackling the problem. It is estimated that 500,000 tons of gypsum per year will yield 75,000 tons of sulphur and

300,000 tons of cement using the Muller-Kobne process. In 1950-51, India imported 55,326.5 tons of sulphur.



BRITISH COLUMBIA—*Macro*, the exploration division of *Kennametal Inc.*, will build an ore dressing and electric smelting plant on Kingsway at Port Coquitlam in British Columbia. The raw material, tungsten ores, and concentrates, will be obtained from B.C. sources as much as possible. Scheelite, hubnerite, and wolframite ores and concentrates will be purchased for refining into tungsten carbide. William M. Stoll, manager of the exploration division, will be in charge of the construction and operation of the re-

fining at Port Coquitlam, as well as of the exploration and mining operations. J. B. Thomson, will be resident manager of the plant. Construction will begin this spring.

QUEBEC—Zinc and nickel deposits have been located in eastern Canada and will be developed jointly by private industry and the government. The deposits are near St. Fabien. Financial interests will spend about \$500,000 to complete exploration of the area, while the government will build roads from the main highways to the mine sites.

ONTARIO—*Kemco Exploration (Canada) Limited*, the wholly owned Canadian subsidiary of *Kennecott Copper Corporation*, has acquired an 81-claim group in Turnbull and Godfrey Townships in the Porcupine district of northern Ontario. The property is considered to be potentially good copper-gold-zinc ground. As soon as the snows melt the area will be surveyed and a permanent camp built.

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WHAT'S THE PITCH... OF YOUR CLASSIFIER SPIRAL?

This is a partial report of new laboratory tests to determine the effect of pitch on raking capacity of a classifier spiral. Here, briefly, is what it means to your classifier operation.

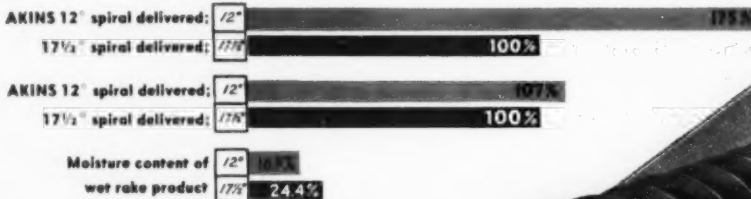


When A tons were produced by the 12° spiral 0.86 A tons were produced by the 17 1/2° spiral. When B tons (test No. 2) were produced by the 12° spiral 0.57 B tons were produced by the 17 1/2° spiral.

The pitch angle of your AKINS spiral is 12° with the pitch equal to half the diameter. Increasing this pitch by, say 50%, increases the pitch angle to 17 1/2°. Our tests using pitch angles of 12° and 17 1/2° were run under identical conditions in all other respects. The figures give the story graphically. Test No. 1 was run with material having a high angle of repose. Test No. 2 was run with material having a low angle of repose.

For most applications under normal field conditions, the 12° Akins spiral continues to prove better. As used in the AKINS Classifier, it produces equal or greater tonnage, with lower moisture content in the end product, on less power consumption and with less wear on all parts (based on slippage and abrasion factors).

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Test No. 1 (first set of bar graphs above):
Tank slope, 3 1/2 in.; Spiral RPM, 5.71;

Test No. 2 (last two sets of bar graphs above):
Tank slope, 3 1/2 in.; Spiral RPM, 5.71;



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INTERNATIONAL

YUKON TERRITORY—The *Yukon Consolidated Gold Corporation, Ltd.* reports that for the 1951 season, 5,878,422 cubic yards were dredged at its property within a 50-mile radius of Dawson. Gold production of \$1,932,525.93 was realized from the operation of seven dredges located on Klondike River, and Bonanza, Granville, Middle Sulphur, Upper Sulphur, Dominion, and Hunker Creeks. Stripping and thawing plants were in operation at Granville, Middle and Upper Sulphur, Dominion, and Hunker. These plants were closed down for the winter. By September 28, and all dredges by November 19. The dredge on the Klondike River will go back into operation from June until September when it will have completed its work. It will then be dismantled. The other dredges will be operated throughout the 1952 season. A small hydraulic operation will be started on Paradise Hill on the left limit of Hunker Creek. All plans for 1952 operations are subject to labor being available.

BRITISH COLUMBIA—*Island Mountain Mines Company Ltd.* reports that the future of its mine in the Cariboo district depends on the finding of substantial ore bodies at depth in proximity to the Mosquito Fault. This fault, located by diamond drilling, has roughly the same strike and dip as the Aurum Fault, but lies 2,100 feet to the south-west. The area thought favorable for ore deposits is at the north-west end of the property near Mosquito Fault, and the Baker-Rainbow contact. About one-third of all 1951 development was done on the 2,550 level and at the end of the year the heading was nearing this area.

ONTARIO—The *Minnesota-Huron Iron Company, Ltd.*, exploration subsidiary of the *W. S. Moore Company* of Duluth, Minnesota—has changed its name to the *Trent River Iron Company, Ltd.* Exploration work is being carried on in eastern Ontario with K. F. Bickford of Ottawa as manager.

NORTHWEST TERRITORIES—Scheelite has been found in the face of the west drift on the 200-foot level of the *Outpost Islands tungsten mine*, operated by the *Tungsten Corporation of Canada, Limited*. The find was made 780 feet west of the No. 1 shaft and about 400 feet west of the old shaft workings. It is the first indication that scheelite was present on this property. Previous company calculations had included no ore between the end of the No. 1 shaft workings and the No. 2 shaft. The discovery leads officials to believe that an ore zone may be opened up for the balance of the 2,000 feet separating the two shafts. Tungsten-bearing ferberite has been the principal ore on these claims until now.

IDAHO—*Sullivan Mining Company* has started to drive an 8,500-foot, mill-level, haulage adit to the main shaft of its *Star mine* from the *Hecla Mining Company's* surface plant at Burke, Idaho. The adit will replace the present 9,000-foot haulage tunnel from the 2,000-foot level of the Hecla shaft which connects with the 4,000-foot level of the Star mine. The new adit will reduce mining costs by eliminating extra ore handling and hoisting.

QUEBEC—The *Canadian Institute of Mining and Metallurgy* has announced the formation of a new branch at Sherbrooke, Quebec. It emphasizes the grow-

ing importance of the mining industry in this area which was until now incorporated in the Thetford Mines branch. First president of the new branch is Herbert A. Burbank of the *Canadian Ingersoll Rand Company*.

BRITISH COLUMBIA—*Frobisher Limited* is diamond drilling a magnetite deposit on Vancouver Island in the Zebalos area and expects to start underground work this summer. Previous drilling is reported to have indicated a length of 340 feet of iron ore, containing 632,000 tons averaging 58.8 percent iron. About 65 percent is expected to average more than 60 percent iron. There are also possibilities of large reserves assaying from

30 percent to more than 60 percent.

NEWFOUNDLAND—1951 was a good year for Newfoundland mining. The 12,000-foot-long continuous belt conveyor at the *Bell Island mine* of *Dominion Wabana Ore Ltd.* was installed. Nine separate belts, each powered by a 300-hp. motor, replaces the former haulage system with its 20-ton ore cars. The company expects this new haulage system to help it to reach its aim of 8,000 tons of ore a day from its mine near St. Johns. The goal for 1951 was 1,750,000 tons. At *Buchans Mining Company, Ltd.* property, 270,000 tons were hoisted; from this, 10,600 tons of copper concentrate, 23,500 tons of lead concentrate, and 48,300 tons of zinc con-

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centrate were produced. The Rothermere shaft was completed at a depth of 2,513 feet and underground development continued from this shaft. Fluorspar output at St. Lawrence rose to a rate of about 85,000 tons a year.

NORTHWEST TERRITORIES—*Salmita Consolidated Mines* has purchased a mill of 100 to 125 tons daily capacity from the *Con* mine at Yellowknife in the Northwest Territories. President of Salmita, Mike Mitto, reports that the mill can expand to 300 tons daily capacity as some of its components are already capable of this mill rate. The mill is expected to recover 75 to 79 percent of gold content by amalgamation, and tailing is to be stockpiled for further recovery, probably by cyanidation. The company has decided to expand its shaft from a two-compartment to a three-compartment operation. Equipment has been ordered to carry out the deepening of the shaft from 145 feet to 330 feet depth. A higher and suitable headframe will be constructed to handle the three-compartment operation.

FLORIDA—The *Humphreys Gold Corporation* near Starke, Florida, is installing equipment to recover staurolite as a by-product from beach sands. Production is expected to start in June. The mine is operated by *E. I. duPont deNemours & Company*. About 25,000 tons yearly of staurolite is expected to be recovered from the tailings of the ilmenite mill.

QUEBEC—*East Sullivan Mines* of Bourlamaque, Quebec, reports a record-

breaking financial year in 1951. In line with this, the company plans further development of its property. To open new ore indicated below the 1,950-foot horizon, the company's shaft is to be extended to 3,000 feet. One ore body discovered recently has over 200,000 tons of ore. The president of East Sullivan Mines is Pierre Beauchemin.

BRITISH COLUMBIA—*Silver Hoard Mines, Ltd.* is planning an exploration program of surface trenching and diamond drilling at its 10 claims near Ainsworth on Kootenay Lake and six claims near Silverton on Slocan Lake. The firm was incorporated last August. The *Ainsworth* group, purchased from *New Jason Mines*, yielded lead, silver, and zinc in earlier days.

ONTARIO—*Coldstream Copper Mines* at Kashabowie, Ontario has completed its plans to install a complete mining plant on the property. Shaft sinking started in April. Mine manager is P. S. Broadhurst.

QUEBEC—The *Maxim Mining Corporation Limited* has signed a contract with *Geo-Technical Development Company* to make a geophysical survey of Maxim property in the Amos-Barraute area of Quebec, and prospecting has started. Copper-zinc values were disclosed by surface work and the company plans to diamond drill when the geophysical survey is completed.

ONTARIO—*Falconbridge Nickel Mines, Ltd.*, of Toronto, has signed a nine-year agreement with the United States Defense Materials Agency for the sale of 50,000,000 pounds of nickel and 1,500,000 pounds of cobalt. The contract also provides for the possible sale of 25,000,000 pounds of copper and an additional 25,000,000 pounds of nickel during the life of the agreement. The nickel ore is to be mined in the Sudbury district of Ontario including the *McKim* and *Hardy* mines. After smelting in Falconbridge's Canadian plant, the processed ore is to be shipped to the firm's Norwegian refinery at Kristiansand which is the point of delivery to the United States. To accelerate the company's expansion program and to increase production facilities in both Canada and Norway, the United States Government will advance \$6,000,000 to Falconbridge. Shaft sinking has been under way at the new Hardy mine for some time and a new headframe and mining plant

are scheduled to be installed there very shortly.

MINNESOTA—The use of water in the Minnesota mining area is expected to triple in the next 25 years. The state conservation department estimates that the increase in low-grade ore concentrating

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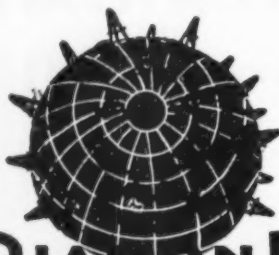
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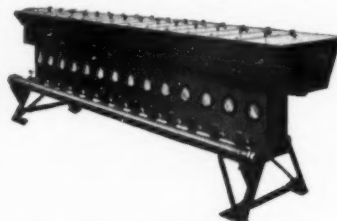
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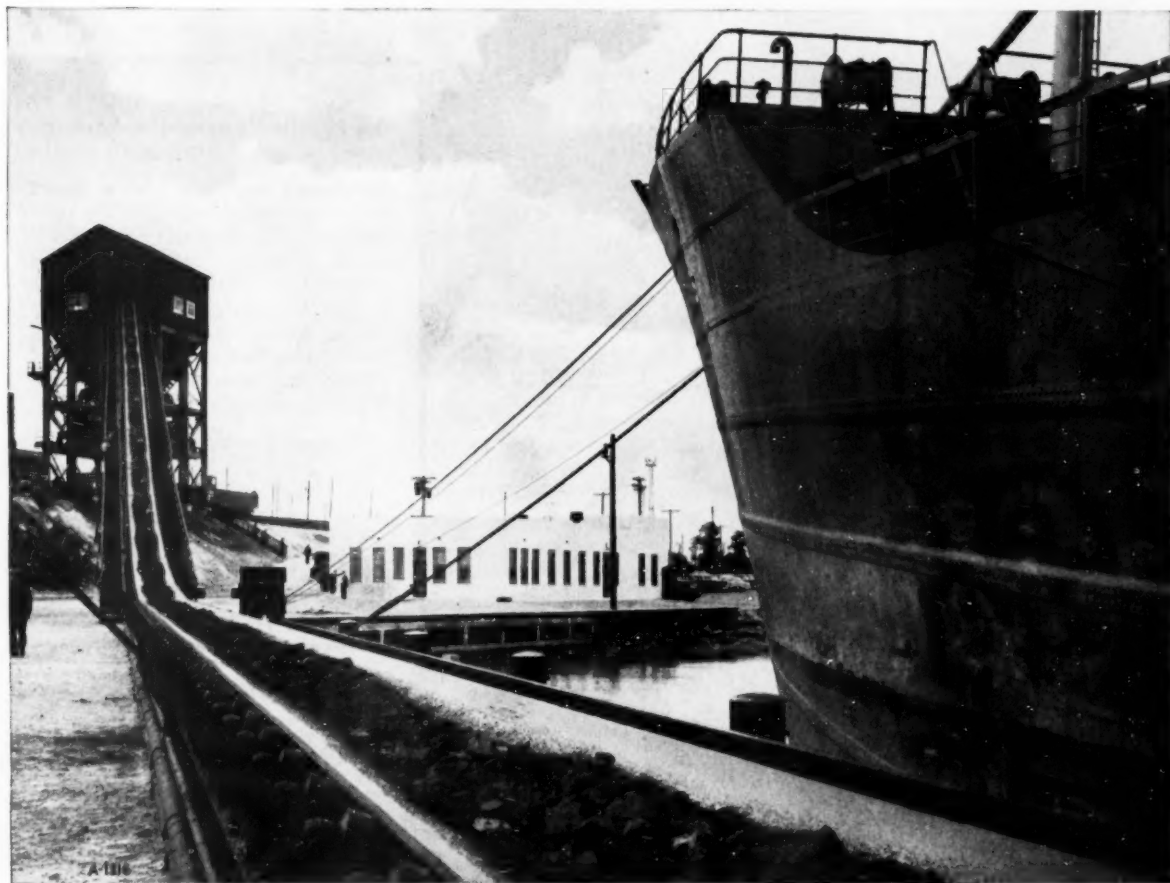
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or **TRAINLOAD** with speed and economy

A shipload is "a lot of ore".

To move it from the ship to a string of railroad cars some 900 feet away, at a rate of 2,000 tons per hour, is no small task. However, S-A engineers are highly skilled in the art of solving these problems—from drawing board to reality. That is why industry has turned to them consistently

for conveying systems designed and equipped to give efficient, low cost handling of bulk materials.

An S-A engineer represents 50 years of experience plus a complete line of equipment . . . he is well qualified to talk to you about bulk ore handling problems. Write us for full details . . . no obligation.



Belt Conveyors
Belt Trippers
Belt, Pan & Plate Feeders
"AMSCO" Steel Pan Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage & Reclaiming Systems
Flight & Chain Conveyors
Screw Conveyors
"Natural Frequency"
Vibrating Conveyors

REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies & Screens
Centrifugal Pilers
Bin Gates & Tunnel Gates
Car Pullers & Spotters
Hoists & Winches
Bucket Elevators
Skip Hoists

Baltimore and Ohio cars wait on a double track rail spur to receive a complete shipload of imported ores within 2½ hours of ship arrival at the new ore docks at Curtis Bay, Maryland. The S-A installation features a four foot wide belt conveyor and several manganese steel pan feeders.

Write for a bulletin on any of the above

STEPHENS-ADAMSON
MFG. CO.

13 Ridgeway Avenue, Aurora, Illinois Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT
MAY, 1952

[World Mining Section—47]

SLUSHING

"Round-The-Corner"

**with a single
setup**

Recesses on bottom of sheave permit scraper connections to pass unit. Either chain or cable connections may be used.

**Newest thing in mining is
the Pacific "Round-the-Corner"
Sheave Block**

Eliminates double slushing. Saves you time and money. Quickly pays for itself. Thoroughly field tested. Light—Portable—Easily installed in timbered or hard rock operations. Model illustrated operates with scraper hoists up to and including 20 H. P. Use Pacific "Slushmaster" or Pacific Drag Scraper for best results. Write for bulletin number 215.



Above illustration shows scraper connecting chain about to disengage from unit. Main inhaul and backhaul cables remain in sheave at all times.

INHAUL

ALLOY STEEL & METALS CO.

1862 EAST 55TH STREET, LOS ANGELES 58, CALIFORNIA

Mailing address: Box 15323 Vernon Station, Los Angeles 58, California

BE SPECIFIC—ORDER PACIFIC— Jaw Crushers, "Slushmaster" Scrapers, Sheave Blocks, Sheave Anchors, Bit Knockers and Pacific Wearing Parts. ★ ★ PATENTS APPLIED FOR.

INTERNATIONAL

operations will raise the area's water consumption from the present 55,000,000 gallons per day to 171,000,000 gallons per day by 1975.

SASKATCHEWAN—*Rix Athabasca Uranium Mines* plans to sink two shafts, one at a time. The areas to be opened by the shafts are the Smitty zone, the ore section now being drilled by Goldfields uranium, and the depth extension of the Leonard series. Before sinking is commenced, a further 6,000-foot minimum of drilling is proposed to explore the depth extension of the Smitty zone to determine its relationship to the Goldfields zone. On the Leonard series, there is still some 3,000-foot minimum of drilling to be completed. Results from the drilling proposed will determine whether the Smitty deposit or the Leonard series will receive first shaft-sinking attention this summer. G. A. Fallis is president of the Rix Athabasca Uranium Mines.

QUEBEC—Mill capacity at *Lamaque Gold Mines* in the Bourlamaque district has attained approximately 2,000 tons of ore daily as a result of a new 500-ton addition completed in January.

ALASKA—*Imperial Jade Company* of Kotzebue, Alaska, after a year of prospecting and exploration, is planning to mine and distribute Alaskan jade this summer. Every known color of jade is reported to be available in the area, some of exceptional gem value. The remainder will be sold for decorative purposes. The huge deposit, in the Arctic Cosmos hills about 150 miles northeast of Kotzebue, has been known for many years but other attempts to mine it have been unsuccessful. Imperial is said to have developed and applied for a U.S. patent on a new low-cost cutting process. Two machines are reported to be ready for operation, and a small hydro-electric and Diesel-electric plant will be installed for power.

ONTARIO—The *Hellens Mining & Reduction Company* has begun operations at its new cyanide mill at Cobalt. It is presently handling 300 tons daily and is expected to be up to 700 to 800 tons daily by midsummer. The first 11 silver bricks poured represented recovery of about 10,000 ounces of silver with an estimated 15,000 ounces tied up in plant absorption since mill tuning started in January. This cyanide milling is to be devoted entirely to the treatment of tailings. Currently, the company is handling 300 tons of tailings a day from the *Beaver* and *Temis-kaming* mines, averaging in excess of four ounces of silver to the ton, and a recovery of three ounces is anticipated. In April, the company started to dredge tailing from Cobalt Lake using a Sauerman dragline and conveyor system. Silver produced at Hellens will be over 99.9 percent pure with no further treatment required. Besides its tailing retreatment project, Hellens is planning for reopening seven mines of the Cobalt Properties. These mines were once large producers of silver and cobalt.

MICHIGAN—*Pickands Mather & Company* has acquired five forty-acre tracts near Iron River and Crystal Falls, Michigan and expects to develop a large open-pit mine on the site of the old *Fortune Lake* mine. Stripping of the property will begin around July 1. *Oglebay Norton and Company* originally developed the property.

MAY, 1952

QUEBEC—M. A. Thomson's *Inspiration Mining & Development Corporation* is preparing to sink a new shaft at *Chibougamau Explorers*. It is to be sunk to a depth of 700 feet, with four levels to be opened at 150-foot intervals. Inspiration, through its subsidiary, *Miners, Inc.*, has been carrying on the extensive Chibougamau Explorers surface drilling program.

BRITISH COLUMBIA—*Columinda Metal Corporation*, with \$250,000 in its treasury and an estimated 19,000 tons of reasonably assured ore with a gross value of \$21,000,000, is a newcomer among British Columbia's mining companies. Its property consists of the *Teddy Glacier* group near Revelstoke and an interest in

Columbia Lead & Zinc Mines, both to be developed and managed by *Mindus Corporation*. T. C. Fawcett, new manager of Columbia, and S. G. Farrar, general manager of Columinda, have been in British Columbia preparing for the season's program. The proposed mill is being designed by E. H. Bronson, mill consultant.

YUKON TERRITORY—Daily milling rate at *United Keno Hill Mines, Ltd.* has been increasing gradually and is averaging about 320 tons daily, with the exception that it will go much higher when hydroelectric power becomes available in the fall. The new cyanide mill, installed last fall to recover silver previously lost in the tailings, is recovering 40,000 ounces a month.

Longyear
and IRON ORE
DEVELOPMENT*
have progressed
together for
60 YEARS!

*BUT

... iron ore is only one of our interests. Since our first diamond drilling contract in 1890 (see top illustration) Longyear equipment, crews, engineers and geologists have been employed from sweltering Africa to the Arctic Circle; from mountainous Venezuela to bleak Labrador. They have successfully explored for all kinds of minerals from asbestos to zinc.

LONGYEAR'S world-wide experience in contract drilling, shaft sinking, mine development and geological investigations can help you solve your problems. Longyear also manufactures a complete line of diamond core drills and equipment.

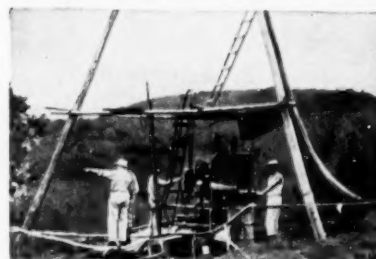
• Write for new General Bulletin 83.

E. J. LONGYEAR COMPANY
MINNEAPOLIS, MINNESOTA, U. S. A.

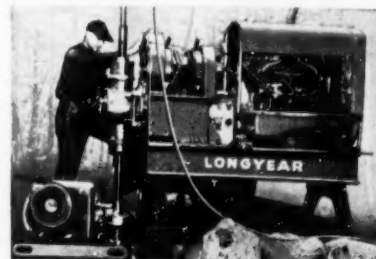
DIAMOND CORE DRILLS • CONTRACT CORE DRILLING • SHAFT SINKING
GEOLOGICAL INVESTIGATIONS



E. J. Longyear drilling first diamond drill hole on Mesabi Iron Range in 1890.



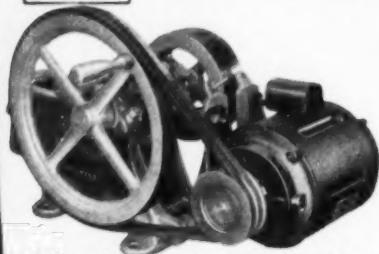
LONGYEAR contract drilling crew prospecting for iron deposits in Venezuela.



Exploring for iron ore in Canada with a LONGYEAR UG Straitline Drill in 1950.

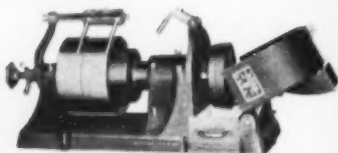
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Assaying Size
QUICKLY AND
EFFICIENTLY**

DFC CRUSHERS



Will reduce hard rock 2½ inches in diameter to ¼-inch and finer at the rate of 50 lbs. to 150 lbs. per hour

DFC PULVERIZERS



Will reduce most ore from ¼ mesh to 100 mesh at a rate of about 50 lbs. per hour.

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WRITE FOR DETAILS AND PRICES TODAY

The Tsumeb Story

Continued from page 26

the top of the fill in the lower stope to the bottom of the fill in the upper stope.

The slots are cut on 15-foot centers, just wide enough to accommodate one set. The sets are on five-foot centers horizontally and are 6½ feet high. They are framed from local timber.

When two adjacent slots have been completed, the intervening panel is then mined from the top downward. Framed caps 100 feet long are fitted into adjacent square sets. When extracting the ore immediately underlying the old fill, spiling is usually required to get the top caps in position. The broken ore is passed down through the slots to chutes on the level below. After the ore has been extracted, fill is introduced as support, and approximately 80 percent of the long caps can be salvaged.

In the future, when mining the ore pillars between stopes, it is anticipated that the fill, a sheared and weathered dolomite, will have consolidated into a cohesive mass. By the time pillar extraction commences, little difficulty will be experienced.

If, however, it is found that the pillars cannot be extracted by the normal horizontal cut and fill method, Mitchell Slicing can be readily substituted.

Stope Fill

Fill for the stopes is obtained from two sources—development waste and a surface glory hole. The lower level development waste will be hoisted to the 1,890 level and dumped into a waste bin; from there, it will be transferred to the waste pass system by a battery locomotive and five-ton cars.

The glory hole is on the footwall or north side of the ore body. The broken waste drops through draw points onto a grizzly, where it is fed to a conveyor belt with a 125-ton-per-hour capacity. The conveyor discharges into the main waste pass system which is equipped with draw chutes at all the levels now in production.

Pumping

Mine water is pumped in two stages with the main pumping plant located on the 1,495-foot level. This plant handles 132,000 U.S. gallons per hour or 3,168,000 U.S. gallons per day.

**How to
SAVE**

on Your ROPE HAULAGE

Sheaves and rollers definitely affect mine haulage costs. Wearing surfaces must be adequately hardened, with interiors and strength members carefully heat treated for toughness. *Card* sheaves and rollers are made under the same high quality control as *Card* car wheels—first choice for hundreds of cost conscious mines.

C.S. Card Iron Works Co.



2501 WEST 16TH AVE.
DENVER, COLORADO

Money Making Methods

Continued from page 30

check until the belated chemical assays from the processing plant are received. The counter actually eliminates the need for chemical assays in the field.

In one instance the difference between the counter reading and the chemical assay from the processing plant was 0.08 percent, which represented several hundred dollars in favor of the buyer. The processing plant was requested to re-assay, which it did, and found their original assay to be in error by this amount.

By attaching a lead shield to the counter tube, interfering radiation is eliminated. This makes possible a direct reading analyses of bulk quantities of ore such as stockpiles, truckloads of ore, or ore in place. With the counter the mine operator can determine the grade of ore in the mine faces, thereby facilitating mining operations and eliminating the expense of breaking waste unnecessarily. The counter is a guide for the operator advancing in ore, and serves a similar purpose for the uranium producer that the Ultra Violet Mineralight does for the tungsten miner.

The principal advantages of the Mineral's counter are:

1. It is accurate within 0.02 percent and saves time, money and effort by eliminating the need for chemical assays in field work.
2. It records impulses on a direct reading dial with a minimum of fluctuation. No computations are necessary.
3. The background radiation, which is always present, can be "zeroed out."
4. It is versatile, with five ranges for different grades of ore.
5. Expensive batteries have been eliminated, and the batteries can be easily replaced in the field.

By connecting a cable attachment with a probe, drill holes may be logged within fairly accurate limits. This use is valuable as a check when there has been a core loss in drilling, samples have been lost, or an error in determination is suspected.

The probe, or counter tube specially designed to withstand rough usage, is attached to a cable of desired length. The probe is lowered slowly down the drill hole, and when it passes through the ore zone readings are taken on the dial, which give an analysis sufficiently accurate for mining purposes.

One of the main features is the inexpensive battery required to operate the instrument. All that is required is three Eveready No. 455 batteries or equivalent, and three flashlight batteries costing approximately \$6.40.

The counter weighs 8½ pounds and is compact in size—11½ by 2 by 7 inches. Its sensitivity makes it valuable for prospecting in areas where the radioactive materials are of low intensity.

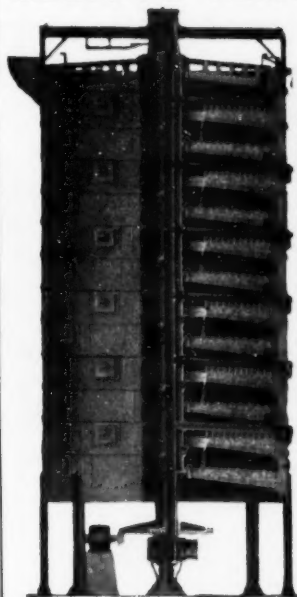
SPRAY LAYTEX TO GUARD METAL

Mufulira Copper Mines Limited is protecting underground metal surfaces against corrosion and abrasion at its mines in Northern Rhodesia. A self curing rubber laytex emulsion is sprayed on chutes, dust fans, air ducts, etc. Results to date have been promising and indications are that it will prove a useful tool in maintenance and repair work. This method is in addition to the one in use where launders, conveyor pulleys etc. are rubber covered by applying semi-cured sheet rubber to the metal surface and vulcanizing under steam pressure.

MAY, 1952

PACIFIC FURNACE

MULTIPLE HEARTH FURNACE



SIZES 8' 6" TO 22' 3" DIAMETER
NUMBER OF HEARTHS, 1-16

ROASTING CALCINING DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
TIN ORES	MOLYBDENUM
NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASHES	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY GRANULES
PYRITE	ANTIMONY

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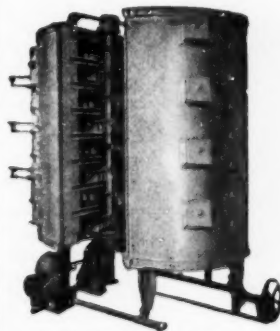
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LEAD CHEMICALS

METALLIC SLUDGES

FILTERING MEDIA

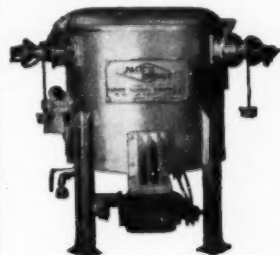
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Other Materials



Pacific Laboratory Furnace

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Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.



Pacific Furnacing Unit

NEW PACIFIC FURNACING UNIT

Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.

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PRODUCTION EQUIPMENT PREVIEW

Production
This **E** section makes **E**conomies and increases **E**arning
Possible **P**ower

Production
thru a **E**quipment that offers **E**fficient
Preview **P**roducts

New Shovel Combines Big Unit Features in 6-yd Size

The Bucyrus-Erie Company is now producing a new 6 cubic yard Ward-Leonard electric excavator, known as the Model 150-B. For the first time various outstanding, field-proven, and exclusive features of this company's large stripping shovels and draglines have been incorporated in an excavator of this size.

The shovel has a lower boom section rigidly connected to the A-frame. Wide-spread boom feet eliminate sway braces. The upper boom section is pin-connected to the lower boom section and is suspended from the A-frame by fixed length bridge strands. The dipper handle is tubular and free to rotate in a cylindrical saddle block which contains rubber cushions to absorb shock loads during plugging of the swing. Single-part doubled hoist ropes are attached with an equalizing sheave to each side of the dipper.



Crowd and retract are accomplished by twin ropes, and the crowd machinery is located at the forward end of the revolving frame instead of on the boom. The dual twin hoist, an exclusive Bucyrus-Erie feature, automatically applies hoisting effort where needed on the dipper lip to cut through local obstructions.

The new shovel is fully and easily convertible to a dragline. To obtain complete information, circle no. 71.

Improved Sampler Offered by Denver Equipment Co.

The Denver Equipment Company has exclusive manufacturing and sales rights to the Denver Automatic Sampler, formerly the GECO sampler made by the Heginbotham Equipment Company. The unit has been redesigned and thoroughly tested in mill operations, proving extremely valuable in obtaining accurate wet or dry sample cuts so necessary for reliable mill control.

The sliding contact has been replaced by a carriage assembly on ball bearing rollers. The cutter, with standard travel of either 16 or 21 inches, is actuated by

a chain and sprocket drive from a gear-motor.

A limit switch shuts off the motor at the limits of cutter travel and a time



DENVER AUTOMATIC SAMPLER

switch reactivates the mechanism according to the established sampling cycle. A manually operated switch can be used to operate the cutter at other than its set time cycle. For further information, circle no. 72.

Newest Off-Highway Truck Engineered for Production

The Kenworth Motor Truck Corporation is beginning full scale production of its new heavy-duty, end-dump earth mover, model 801, a truck engineered to the last detail for earth moving under even the most adverse operation conditions.

This new 15-ton Kenworth is over-tired for safety, floatation and high tire life. The truck's body capacity, struck measure, is 9.9 cubic yards, with heaped load at 11.9 cubic yards. It has a full anti-friction bearing mounted, power assisted steering gear, simplified controls,



minimum turning radius and wide axle track to insure ease of handling, maximum maneuverability and high stability. The offset cab provides exceptional visibility for the driver both fore and aft.

Special consideration has been given to simplicity and ease of access for periodic servicing and maintenance. Circle no. 73.

Low-Cost Geiger Counter Has Laboratory Accuracy

A need has existed for sometime for a Geiger counter that is as accurate as expensive laboratory models, but that sells for a much lower price. Precision

Radiation Instrument's new model 107 fills that need.

The instrument has a three range meter, a neon flasher and earphone indicator with ranges of 0.2, 2.0 and 20 milliroentgens per hour full scale, and accuracy within 10 percent on all ranges. The counter is completely waterproof and is provided with a calibration control on the top panel. A calibrated radioactive



sample is supplied for field calibration. The Geiger tube is contained in a directional probe with a sliding shield for discriminating between betas and gammas. Batteries last for many months and can be replaced at a cost of \$4.25. The unit measures about 4 by 4½ by 6½ inches and weighs about 5 pounds. Circle no. 78.

Diesel Locomotives for Underground Mine Haulage

The Mancha Storage Battery Locomotive Division of Goodman Manufacturing Company is now offering Diesel powered locomotives for use in metal mines and tunnels.

Illustrated here is a 4-ton unit powered by a 45-horsepower engine which drives through a torque converter. Running speeds are from three and a half to seven and a half miles per hour depending on the drawbar pull demand.

Exhaust gases are effectively conditioned by a water scrubber to prevent



discomfort to underground personnel. Particularly careful attention has been given to specific underground requirements in the design of these Diesel units. For full details, circle no. 74.



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To express your opinion of MINING WORLD. What department do you enjoy most? What material in a mining magazine do you read with the greatest interest?

Turn the page. Fill out and mail the reply card at the top—low!

HI-CAPACITY BLASTER: Du Pont has announced an entirely new battery-condenser blasting machine that is capable of firing 1200 caps when connected in parallel-series. This portable blaster offers maximum safety at all times and contains no moving parts. Circle no. 1.

NEW OVERLOAD GUARD: To protect valuable machines and motors from the dangers of overloading, the Dodge Manufacturing Company has introduced a positive-action release that loosens drive belts, shuts off power, and gives a warning signal. The unit is simply installed and easily adjusted for the needs of each installation. Circle no. 2.

ALL-PURPOSE FEEDERS: Syntron vibratory feeders are electrically operated for the smooth flow of any type of wet or dry material from light, fine powder to coarse, heavy lumps. They are available in capacities that range from one ton per hour to hundreds of tons per hour. To obtain Syntron's illustrated folder, circle no. 3.

PREVENT ABRASION: Where abrasion resistance is required, cast basalt is one of the finest materials available. Obtainable in standard curved or flat shapes—or special shapes, if needed—from H. Windsor and Company, cast basalt offers a compressive strength of 70,000 psi with a Mohs hardness of 8-9. Circle no. 4.

NEW TELESCOPING CRANE: Bucyrus-Erie's Hydrocrane has a telescoping, hydraulic boom that will reach through doors and windows and above, below, or between beams and wires without moving the crane itself. Hydraulically operated grapples and buckets are available to supplement the machine's versatility. Circle no. 5.

NEW FROTHER: Actual mill tests have shown that the newly-developed Dowfroth 250 will give improved recoveries thru a quicker-breaking, livelier froth, lower reagent concentrations than former frothers would permit. For a free sample, mail the coupon on page 19. Readers outside the United States should contact the Dow Chemical Company, Dept. OC 47, Midland, Michigan.

EXACT BTU ANALYZER: Industries throughout the world are finding that Sturtevant's automatic coal sampler will increase boiler efficiency and cut operating costs by accurately and rapidly sampling bulk coal for precise BTU values. Get Sturtevant's booklet, "How to Sample Coal Automatically," by circling no. 7.

DIESEL INSTRUCTION: Because of expanding worldwide use of Diesel power, Cummins Diesel Export Corporation now offers free engineering assistance to power users and has made available operating

instructions in English, French, Spanish, and Portuguese. For full information, circle no. 8.

MAGNETS CATALOG: A 12-page catalog on the entire line of Dings magnetic separators and lifting magnets tells which magnets to use to remove iron from wet or dry materials carried on conveyor belts, as well as from chutes, ducts, etc. For a copy of the booklet, circle no. 9.

IMPROVED CARBIDE BITS: With channel design that gives maximum clearance and with full insert support to absorb impact on every stroke, Brunner and Lay Rok-Bits guarantee the most for your money from both man and machine. Circle no. 10.

pH CONTROL IN MILLING: New Data File describes latest techniques with completely electrometric equipment for instantly determining the exact pH of any flotation circuit. This literature shows how greater speed, convenience and accuracy can be obtained in laboratory leaching or flotation tests, with provision for centralized or automatic control of multiple flotation circuits. Applicable to the flotation of lead, zinc, copper, gold, tungsten and many other ores and minerals. Write for Data File 5-54 direct to Beckman Instruments, South Pasadena 54, California, or circle No. 40.

Circle numbers and mail this card for free product literature

To get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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May '52

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What should a mining magazine contain? Does MINING WORLD fill the bill? If not, why not?



Please fill out and mail this reply card immediately.

SHAFT MUCKER: Bucyrus-Eric's Hydromucker is a self-activated clamshell designed for faster, more efficient low-cost shaft mucking. The Hydromucker is simple and easily installed and increases output up to 35 percent. Circle no. 12.

CONVEYOR BOOKLET: A new booklet has been published by the Carlyle Rubber Company on the installation, care and maintenance of conveyor belting. To reduce conveyor costs, use this aid to proper materials handling. Circle no. 17.

THE NEWEST IN MINE PIPE: Have you ever wanted mine pipe that won't rust, rot or corrode; a flexible pipe that can be used with hot or cold water, acids or alkalis under pressure or suction? Such pipe is now available from the Yardley Plastic Company in sizes from 1/2" to 6". Circle no. 16.

UNDERGROUND AIR TRAMMER: Since air is available underground, the logical power for locomotives on short light hauls is a compressed air drive. Mancha's air trammer is a small, compact, easily re-charged unit that combines the advantages of easy handling and low cost. To get air trammer bulletin MH-511, circle no. 18.

HI-CAPACITY HORIZONTAL FILTER: Where large tonnages of material need

to be washed or filtered quickly, Oliver's horizontal filter offers an answer. Capacity is high and all factors bearing on filter efficiency are in easy view of the operator—nothing of operating importance is hidden. Circle no. 26.

IMPROVED CAR WHEELS: Sanford-Day Floater ball-bearing wheels have been found to increase pay loads 50 percent over conventional ball-bearing wheels and to prevent costly downtime caused by failures due to the entrance of dust and dirt and the loss of grease on sensitive bearing surfaces. To prevent this production bottleneck get further information on S-D Floaters by circling no. 34.

WELDING AND BRAZING: An illustrated folder on welding, brazing and cutting steel with torch and arc has just been released by All-State Welding Alloys Co., Inc. Contained are complete instructions for use, techniques of application and description of the properties of twelve alloys for welding and brazing and one alloy for cutting. Circle no. 49.

GENERAL PURPOSE PUMPS: Construction details on Allis-Chalmers' grease-lubricated, pedestal-mounted, general purpose pumps (Type SSB) are given in a new bulletin. The pumps, available in capacities to 2,500 gallons per minute at heads to 550 feet, can be had in a choice of materials that will handle almost any

liquid at temperatures to 250°. Circle no. 53.

FREE HAULAGE ANALYSIS: To give you the latest information on the most efficient underground haulage system available for the specific needs of your operation, engineers of the Mancha division of the Goodman Manufacturing Company have designed a data form on which they can base a complete analysis of the haulage problems inherent in any given operation. Readers of WORLD MINING outside the United States can obtain the data form without obligation or charge by clipping and sending to Mancha the coupon on page 64 of the overseas edition. United States readers interested in Mancha's haulage service should circle no. 23.

MINE PHONES: Explosion-proof sound powered telephones are available from the United States Instrument Corporation. To obtain a catalog that describes both surface and underground applications of sound powered equipment, circle no. 58.

PERFORATED SIZING PLATE: The Hendrick Manufacturing Company's perforated plate catalog contains the details and specifications of their complete line of screen plates, available in flat or corrugated forms in any desired gauge, size, or hardness. Circle no. 67.

For Free Product Literature, see other side

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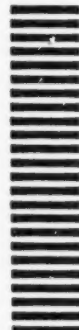
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URANIUM ANALYZER: Minerals Engineering Company has produced a new portable counter that, with proper procedures, will give the U_2O_5 content of ores accurate to within 0.02%. The device combines accurate analyzing with portability and high sensitivity for field prospecting. Circle no. 15.

TIMBER PRESERVATIVES: Osmosalts and Osmoplastic are preservatives that will increase the life of mine timbers from 3 to 5 times. To get Osmose Wood Preserving Company's book, "Force Down Your Operating Costs," that describes Osmose treatment, circle no. 19.

CONVEYOR SYSTEMS: Hewitt-Robins, the only manufacturer offering a complete mine conveyor—machinery, belt, motor, reducer, and drive—has made available the detailed specifications on their many conveyors. Circle no. 20.

STRONGER WIRE ROPE: Hercules flattened strand wire rope offers the greatest strength and durability in any given size of rope since its unique design packs more steel per inch of diameter than any conventional rope and allows sheave contact by four external strands rather than one, as in most ropes. For more details, get Leschen's "Wire Rope Handbook." Circle no. 21.

STOPPER SAVES CARBIDE BITS: Chicago Pneumatic's CP-34 stopper assures long service from expensive tungsten-carbide bits by combining the right piston and rotating speed, stinger pressure, and hammer blow. The drill features graduated control of feed-leg and an instantaneous pressure release. For complete information, circle no. 14.

THREE-PRODUCT HMS: The Akins separator is the heart of Colorado Iron Works' new HMS unit that produces concentrate, middling, and tailing in a single-stage operation. Get bulletin 49 describing the new unit by circling no. 11.

INSIDE A ROD MILL: Ever wonder what goes on inside a rod mill? Harding's bulletin 25-C-3 contains a complete discussion of the theory and proper application of rod mills. Circle no. 13.

JET PUMPS: The Penberthy Injector Company has released a new catalog covering a complete line of jet pumps that use steam, air, or water as the motive fluid; have no moving parts or packing glands; require no foundations; are small in size and practically noiseless; and can pump solids in suspension. To obtain this bulletin, circle no. 54.

NEW CONVEYOR BELT: The Raybestos-Manhattan, Inc., has announced literature on their new "F" conveyor belt that is engineered for application where there is danger of tearing or puncture, where small pulleys are used, where more flexibility is required, and where thick, narrow belts are required. Circle no. 56.

SPOT TESTING: The International Nickel Company has published a booklet that covers the rapid identification of many metals and alloys. The spot tests described will prove valuable for the segregation of materials and optimum salvage of scrap. To get a copy of this pamphlet, circle no. 65.

VALVE LUB: An article reprint made available by the Minneapolis-Honeywell Regulator Company and entitled "Proper Valve Lubrication . . . A Prerequisite to Good Control" discusses the importance of proper valve lubrication in keeping valves operating at peak efficiency. For a copy, circle no. 70.

Air-Cooled Diesel Powers New 3-kw Electric Plant

A new 3,000-watt Diesel-electric plant, powered by a four-cycle, single-cylinder, air-cooled full-Diesel engine, is available from D. W. Onan and Sons, Inc. Simplified plant design makes it possible for anyone to operate and service this model 3DSP-1E unit. Push-switch



C1525A

control for electric starting, manual compression release, and an electrically heated glow-plug for cold weather starting are provided.

The improved engine incorporates many new engineering features to increase power output, operating efficiency and economy.

The compact and easily installed unit generates 115-volt, 60-cycle, single-phase current. Other single-phase models are available for 230-volt and 115/230-volt output. A 32-volt battery-charging model can also be supplied. All models are conservatively rated to provide ample overload protection. Form A286, with complete specifications, will be sent by circling no. 76.

Stockpile Loader Provides Fast Materials Transfer

A new stockpile loader, produced by the Athey Products Corporation, represents four years of extensive research, engineering and testing. One of the outstanding features of the machine, known



as the HiLoader, is the Athey full-floating feeder suspended from two coil springs and a pivot, allowing the paddle blades to float over the contours of the stockpile base.

The fins of the auger screw extend to the moldboards of the gather and keep a steady flow of material feeding inward to the paddle blades. The unit features a 30-inch transfer conveyor cleated to handle light or heavy materials, and a swiveling discharge conveyor that can be directed 45° right or left of center. The operator's platform is on the left side for unobstructed visibility in all directions. All operations are controlled with hydraulic power by levers in easy reach of the operator's seat. Circle no. 79.

Notes From The Manufacturers

International Harvester is continuing and expanding its program, started in 1951, of using mobile schools on industrial power products to present service and technical information on its tractors and engines to International Harvester distributor personnel and customers. These truck and trailer units, housing the equipment to be demonstrated, will "give distributor sales and service men a unique opportunity to study product features and service techniques" according to I. P. Payne, International Harvester's assistant general sales manager. Last year the mobile units traveled over 31,000 miles and presented programs to more than 20,000 people in the United States and Canada. With the products of International Harvester constantly undergoing change and improvement, the company feels that the programs enable the men to do their jobs more efficiently and they also act as a supplement to the factory training program.

Hewitt Equipment Ltd., Montreal, has been formed to serve as a new *Caterpillar Tractor* distributor for the Province of Quebec with the exception of the Magdalen Islands. Robert Hewitt, formerly vice president and director of Geo. W. Crothers, Ltd., a Caterpillar distributor in Ontario, is president of the new organization. French manufacturer, Corpet Louvet & Cie, has been licensed to build Caterpillar earthmoving equipment bringing to four the number of manufacturers outside the United States who manufacture Caterpillar products.

Carl E. Swift of Los Angeles has been appointed representative of *Mace & Company* of Denver, Colorado, manufacturers of furnace, roasters, mills, smelters and other heavy equipment, for southern California. He will personally handle calls to buyers of mining equipment in the Los Angeles area.

George E. (Tex) Bannister, export representative for *Hyster Company*, is currently traveling in Europe. He will visit Hyster dealers in Portugal, Spain, Italy, Switzerland and France and assist them in applications of Hyster equipment and modernization of their facilities. Kenneth E. Guptill, also an export representative for Hyster, is currently on a trip to Cuba, Puerto Rico and Mexico to consult with Hyster dealers and demonstrate the company's equipment.

The board of directors of *Allis-Chalmers Manufacturing Company* has given approval to a project for increased facilities at the Springfield, Illinois Works-Tractor Division. Construction is expected to be underway before the middle of summer and the addition will be located east of the main building of plant No. 1 in Springfield. This will be the third expansion of the Springfield Works since World War II.

W. C. Campbell was recently promoted from manager of the Joy Division of *National Mine Service Company*, Beckley, West Virginia to manager of mining sales of the Whiteman Division in Indiana, Pennsylvania. Mr. Campbell is succeeded as manager of the Joy Division by W. J. Noel.

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ASARCO Begins to Strip Silver Bell Property

Stripping of the ore body has been started by American Smelting and Refining Company at its Silver Bell Unit, 40 miles northwest of Tucson, Arizona. The work is being done under contract by the Isbell Construction Company, with R. S. Isbell, manager, and John Ward, Jr., superintendent. Work is conducted on a two-shift basis.

The Silver Bell Unit is composed of the Oxide and El Tiro mines, owned by ASARCO for a number of years. Ore reserves, as determined by churn and diamond drilling, are 32,000,000 tons, assaying approximately 0.9 percent copper, which can be mined by open-pit methods.

RFC Group Inspects San Manuel Property

Regional directors of the Reconstruction Finance Corporation have made an inspection trip to the properties of the San Manuel Copper Corporation at Tiger, Arizona. Their visit was in connection with the company's application for an RFC loan of \$100,000,000 to complete the developing and equipping of the mine.

San Manuel is a wholly owned subsidiary of Magma Copper Company. To date, approximately \$10,000,000 has been spent in test drilling, shaft sinking, and other preliminary work. Plans for production call for a 30,000-ton-per-day reduction mill, a smelter, a railroad spur, and complete town and plant facilities. The low-grade ore body is said to be capable of producing up to 70,000 tons of copper a year, and to have a life expectancy of at least 50 years. Wesley P. Goss, general manager of Magma, is directing the exploration program.

Hector Haight, director of the Los Angeles regional office of the RFC; John Rice, regional counsel; and members of the RFC's technical staff made the inspection trip.

Nevada Iron Mine Reopens For Japanese Shipments

An estimated 300,000 tons of hematite iron ore will be mined 20 miles south of Palisades, Nevada, this year, by the J. R. Simplot Company which started operations again this month after the winter season. The mine first began production last September and, prior to this winter's bad weather, shipped 109,000 tons of ore destined for three major steel mills in Japan.

George McHugh, consulting engineer for the firm and manager of the mine, said the mine will employ an estimated 50 men in the open pit operation this year, and would utilize around 100 trucks and drivers. He also announced the appointment of John Kobe, manager of the Fort Hall, Idaho phosphate mine, as superintendent of the iron mine. He

said that Kobe would also continue as manager of the Fort Hall operation.

In 1951, the company built eight miles of truck access road from the mine to Nevada State Highway No. 20, and re-widened and maintained 18 miles of the highway to the railroads at Palisades. The ore is handled over the Western Pacific and Southern Pacific railroads to Pacific Coast ports.

Anaconda Makes Progress On Yerington Project

C. V. Isbell Construction Company of Reno has been awarded the contract for preliminary stripping of the Anaconda Copper Company's Leviathan mine in Alpine County, California. The mine is to furnish sulphur for Anaconda's operations at Yerington, Nevada. Preliminary surveying is also underway for the right-of-way for an access road from the mine to the main highway.

Anaconda will conduct its own stripping operations at Yerington, using five-yard shovels. Plans call for handling ore with as low as 0.6 percent copper, although surveys show average content to range to about 1.0 percent. Concentrates will be shipped to the company's smelter at Anaconda, Montana.

Yerington has been declared a critical defense housing area by the federal government because of the urgent need for

copper. Construction of a townsite is now in progress and is expected to be completed in the fall. The leaching plant is also under construction. Initial operation is expected by the middle of next year.



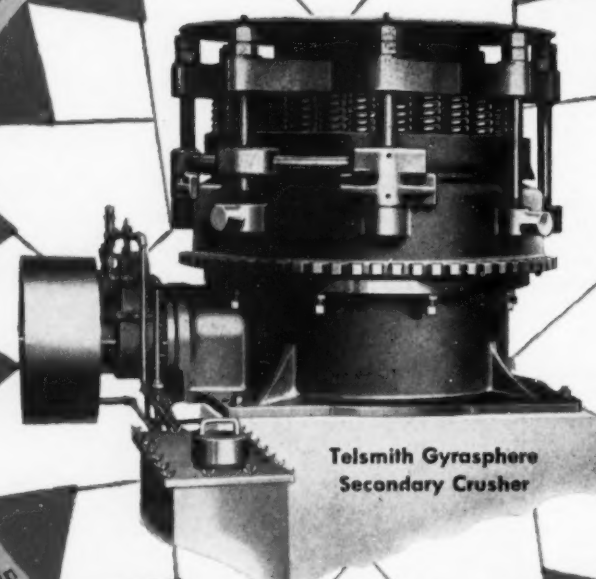
Phelps Dodge Corporation reports that the experimental work for the commercial recovery of the small quantities of molybdenite contained in the ores at the Morenci Branch, Morenci, Arizona, has been largely concluded with good results. By the end of 1951, the necessary changes had been made in the concentrator so that all of the copper concentrate production is now treated to recover molybdenite as a concentrate. The molybdenite concentrates produced during 1951 amounted to 487 tons. Smelter production for the year 1951 at the Morenci Branch amounted to 290,454,954 pounds of copper, compared with 309,353,406 pounds in 1950. The total tonnage removed from the open-pit mine during 1951 amounted to 43,986,406 tons, of which 15,537,924 tons were ore and 28,448,482 tons were waste and leach material. The ratio of



KENNECOTT ERECTS SURFACE STRUCTURES

Nevada Mines Division of Kennecott Copper Corporation is making rapid progress in erecting surface structures at its \$7,000,000 underground copper project at Ruth, Nevada. The 154-foot headframe used at the Wedge and Monitor shafts has been moved to the Deep Ruth shaft and the shaft has been sunk to a depth of 450 feet. A hoist from the Ruth mine has been put into service there, too, along with a 500-ton ore bin which was moved intact more than two miles by tractors. The moving of the bin took about four months to complete. A hoist house purchased from Consolidated Coppermines Corporation will serve the ore and man hoists to be installed for use at the 1,600-foot, five-compartment shaft. A change room has been completed and a heating plant is near completion. Construction of two miles of railway spur from Keystone to the shaft site has been accomplished, as well as power line changes at the Deep Ruth site and a new power line to the old Kellinske shaft, now being enlarged and deepened.

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waste and leach material to ore was 1.83, in comparison with 1.66 in the previous year. The average daily milling rate was 48,791 tons.

The *Hillside Mining and Milling Company* of Bagdad, Arizona, is preparing its *Tungstona* mine for production and has added a new unit to the mill at Hillside for the recovery of tungsten. At last reports, the main tunnel had been driven more than 400 feet. J. C. Lincoln of Scottsdale, Arizona, is president of Hillside Mining and Milling Company and E. G. Green is manager.

The *Black Diamond* manganese claims have been acquired by F. A. Sitton of Phoenix, Arizona, from Mark Hall, Claude K. Neal, and Carol S. Farley. It is reported that Sitton plans for the erection of milling facilities immediately. The *Black Diamond* is located in the Artillery Peak district, Mohave County, Arizona, and probably has in excess of 50,000 tons of manganese ore developed. Some shipments of manganese ore have been made recently. Sitton, who is best known for his activities in the uranium fields, has extensive holdings at Dove Creek, Colorado, Monticello, Utah, and Grants, New Mexico.

The *Magma Copper Company* at Superior, Arizona, is reported to have struck a body of high-grade ore in a new section of the mine, but close enough to present working to be reached by long tunnels. According to William P. Goss, gen'l manager, no estimate of tonnage or value can be made at this time, but exploration, so far, indicated a body of ore that "looked good" and whose metals content was similar to the ore of the existing mine. He de-

scribed it as a replacement deposit in limestone.

Shipments of about 50 tons of ore monthly are being made from the *Sheldon* mine in the Walker mining district of Yavapai county, Arizona. Since the property was taken over by *Allison Steel Manufacturing Company* of Phoenix, about a year ago, the shaft has been unwatered and retimbered and considerable repair and cleanup work accomplished on both the 400 and 600 levels. More recently, raising from the 400 to make connection with another shaft has been started. A crew of 37 men are working on a two-shift basis.

The *Arizona Barite Company* is opening up a barite deposit about 20 miles south of Aguila, Arizona. The new property is to be developed as an open pit operation, and stripping of the overburden has started. At the company's underground property, east of Mesa, 18 men are employed on a three-shift basis and production is running better than 2,500 tons monthly. William F. Paine of Mesa, Arizona, is manager.

The *United States Tungsten Corporation* has been incorporated under the laws of Arizona to acquire the *Zannaropolis* group of claims, 38 miles northwest of Congress, Arizona. Officers of the company are John Ph. Zannaras, president; Charles P. Lower, treasurer; and John P. Robinson, Jr., secretary. The company is making plans for more extensive work at the tungsten claims in the immediate future.


Steady production, running from 150 to 200 tons of asbestos monthly, is reported from the *Phillips* asbestos property in the

McMillan district, Gila County, Arizona. Guy Phillips of Globe, Arizona, is owner of the property.

Eugene Meyer has retimbered the old shaft at the *Stoddard* mine, Mayer, Arizona, has installed hoisting equipment, and is taking out some ore for mill testing. He is employing three men in the underground work. Meyer was recently granted a Defense Minerals Exploration Administration contract for \$4,190, of which the government will supply one-half, for diamond drilling at the *Stoddard*.

The *Mineral Development Corporation* of Dallas, Texas, and Bisbee, Arizona, has acquired the *Reef* group of tungsten claims in the Huachuca Mountains from J. J. Seeman of Hereford, Arizona. According to H. W. Coke, engineer in charge at the mine, plans are being made for a daily production of 200 tons. Lumber and building materials are being trucked in for immediate construction of a few living units, as about 10 men are already employed. Later, the company plans for mill construction. The *Reef* ground was located originally for gold and was first worked for tungsten during World War I. In 1918, the claims of the *Exposed Reef Tungsten Company* were taken over by the *Tungsten Reef Mining Company*. Since about 1935, the group has been leased to J. J. Seeman who produced a considerable tonnage of concentrates with a small gravity plant.

The *Hagey* group of claims near Chloride, Arizona, has been purchased by A. A. Van Wormer of National City, California. John and Julia Hagey, the former owners, have 15 other claims which they have united with those of two other groups to



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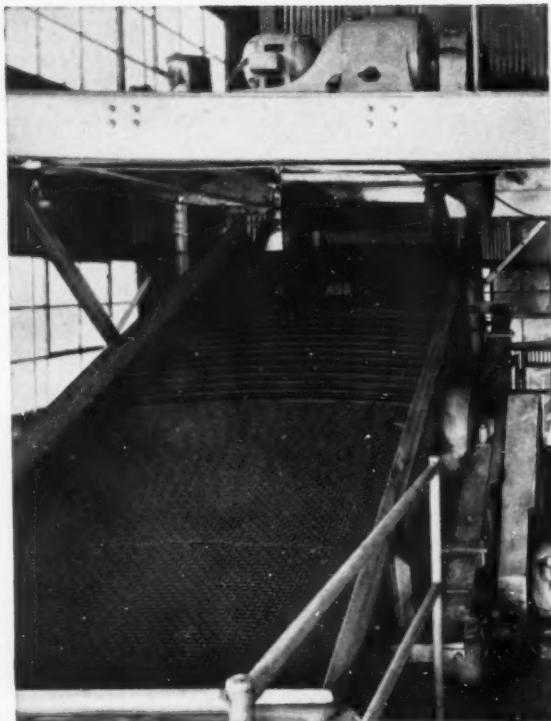
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form another group of about 75 claims. These are being developed for gold, silver, lead, zinc, copper, and some manganese. The claims are located in the Wallapi mining district of Mohave county, Arizona.

Coronation Mining Company, Inc. reports that it has granted a 25-year lease upon four of its mines near Bouse, Yuma county, Arizona, to Philip J. Ragooland and associates. Mr. Ragooland, owner of the Ragooland Laboratories in San Francisco, California will be president of the *Arizona Metals Recovery Corporation*. J. Paul Jones, recently returned from Australia where he was in charge of some gold recovery operations, will be in charge of mining operations for Arizona Metals.

A 458-foot shaft, known as the Brown shaft, has been sunk into bedrock by the *Golden Crown Mining Company* on a group of claims in the Big Bug district, Arizona, adjoining *Shattuck Deem Mining Corporation's Iron King* mine. Diamond drilling from the bottom of the shaft has now begun to ascertain whether the Iron King vein continues under Golden Crown's property. The company's exploration program is being directed by Arthur R. Still and Alfred D. Wandke of *Southwestern Geological Service*, Prescott, Arizona. R. M. King of Humboldt is mine superintendent. The Golden Crown is headed by Ralph G. Brown of New York City.



U. S. Vanadium Company's mine and mill at Pine Creek, California are back in operation after a severe winter and some damage from snowslides. The mill proper was not damaged by the avalanches but the new research laboratory was wiped out; the rear wall of the garage and carpenter shop were crushed; and a small building covering the secondary crusher was destroyed, along with the building housing the molybdenum thickener. Johansen's tram terminal near the mill also was taken by a slide which traveled through the Vanadium yard and stopped at the mill office building. Snow also knocked out the *California Electric Power Company* substation at the Vanadium mill. A. P. Courtelyou, general manager, and Walter Remmers, president of Vanadium, flew from New York to survey the damage after the worst slides which buried several of the employees. All were rescued.

The *Molybdenum Corporation of America's* new chemical plant at Mt. Pass, California is nearing completion. The plant adjoins the concentrating mill recently revamped. The mill has been running and is being adjusted to produce concentrates from the rare earth minerals on the property.

The *Highland Mary* mine north of Downieville, California has been sold to Miles Schofield. The property was last held by the *Highland Mary Mining Company*. About 36 acres of land are involved in the sale.

C. H. Thurman and A. J. Wright have moved a 5-yard full, electric dragline dredge to Butte Creek near Chico, California, where extensive gold-bearing gravel is said to be available. The dragline digs to a depth of about 15 feet to

MINING WORLD

bedrock digging a pond 400-feet wide. It handles 400 cubic yards of material per hour. The Pacific Gas and Electric Company supplies the needed power for the dragline and washer.

The *Walabu Mining Company* of Bakersfield, California, has started work to develop ore reserves at the *Cuddeback* quicksilver mine near Keene, California. At present, a tunnel is being run to cross-cut the vein near the surface at about 100 feet.



Pioche Manganese Company, a subsidiary of *Combined Metals Reduction Company*, has been granted three certificates of necessity by the Defense Production Administration permitting quick write-offs on 75 percent of a total of \$3,191,281 spent to increase mill capacity at the company's mine and mill at Caselton near Pioche, Nevada, and to construct a manganese smelter at Henderson, Nevada. The mill produces a manganese-iron concentrate which, in turn, is shipped to Henderson, to make ferromanganese electrolytically.

Basic Refractories, Inc. of Gabbs, Nevada, has acquired the physical assets of the *Sierra Magnesite Company*, also of Gabbs. Basic Refractories has also obtained a lease to mining claims on magnesite deposits adjoining the company's properties. The new claims contain developed ore bodies amenable to low-cost, open-pit mining methods.

New World Exploration, Research and Development Corporation, together with John Uhalde and Rhoads Grimshaw, has started shipment of iron ore to Japan from Stuart Welter's *McCoy* iron mine at Battle Mountain, Nevada. New World Exploration carried out the geological, geophysical, and drilling work which blocked out a good tonnage of high-grade iron ore.

The *Newmont Mining Corporation* has decided to launch a new diamond drill program at its group of claims near Goldfield, Nevada. At least two drill holes will be put down as the first phase of the exploration program. The site will be close to the area where a number of holes were drilled in 1949. Newmont was active in the area for almost seven years, but closed down operations early in 1951. A 100-ton ore treatment plant, although inoperative for almost a year, is presumed to be in good condition and ready to go into production if the circumstances warrant it.



The *International Minerals and Chemical Corporation* completed another major step in its southwest expansion program at Carlsbad, New Mexico, when the drift from the No. 3 shaft was holed through to the No. 1 shaft drift. Company officials consider it a remarkable engineering feat that the drive from the No. 3

shaft met the short drift extended from No. 1 so closely that the connection offset cannot be located. The company also is rushing completion of design work for the new magnesium oxide plant to be built for it by *Stearns-Roger Manufacturing Company*. Final layouts of the plant and equipment have been approved and actual construction is scheduled to start about June 1. Refinery and chemical plant superintendent C. E. Pressnell will be supervisor of the new plant.

The *Phelps Dodge Corporation* is conducting a surface drilling program at its *Burro Mountain* mine at Tyrone, New Mexico, in an attempt to develop a low-grade orebody which can be mined by open-pit methods. The results to date are encouraging. The original underground mining of copper ore was discontinued in 1921, as the ore of comparatively high grade was scattered and could not be mined economically under then existing conditions.

Terms of the uranium prospecting contract reportedly made between F. A. Sitton of Colorado and the Acoma Indians are to make a \$500 token payment and to file any lease request within 90 days. The *Anaconda Copper Mining Company* has a similar agreement with the Laguna Indians and is said to have requested a lease to mine uranium on 800 acres of that Indian's land.

The *Miser's Chest* mine near Lordsburg, New Mexico, owned by the *Banner Mining Company* is to continue in operation under a new price schedule announced by the DMPA administrator, Jess Larson. The Agency has agreed to pay prices above current ceilings to the firm during the next two years for 5,438,000 pounds of copper which "would otherwise be lost" to the defense program. The DMPA will pay the company 30.53 cents a pound on the basis of refined electrolytic copper in return for keeping the Miser's Chest in operation. The price of copper is 24.5 cents. Under this existing ceiling price, the Miser's Chest was about to shut down because the mine is considered a "high cost" operation.

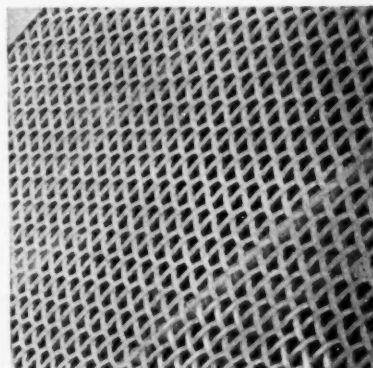


The United States Atomic Energy Commission has signed a contract to purchase by-product uranium from the *Texas City Chemicals, Inc.* The firm processes phosphate rock to chemical fertilizers and will install additional equipment for uranium recovery.

The *Texas Mining & Smelting Division* of the *National Lead Company* at Laredo, Texas, is anxious to buy antimony ore and will pay the freight on carload lot shipments. The schedule ranges from \$4.86 a short ton unit, for 50 percent antimony, down to \$2.56 a short ton unit for 20 percent antimony. The main drop in payment rate is between the 30 percent and the 20 percent ore, the rate for 30 percent being \$4.01 a short ton unit.

The *Carpenter Exploration Company* of Van Horn, Texas, is developing the *Purple Sage* lead-silver mine, 35 miles south of Van Horn. Frank Carpenter, Jr. of Houston, Texas is president. W. L. de Carbonel is mine manager and is supervising the sinking of a new shaft which is down over 100 feet.

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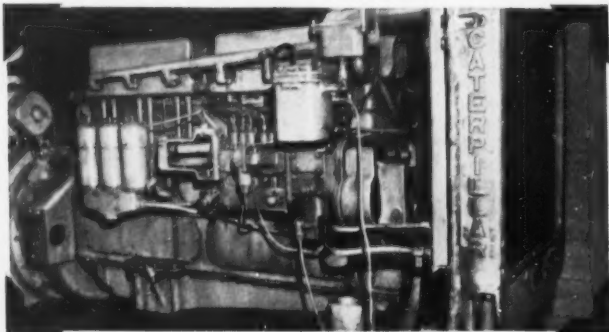
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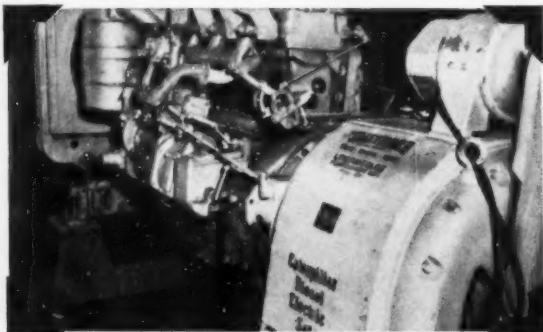
STANDARD ENGINEER'S REPORT

PRODUCTS	DATA Standard Diesel Fuel and RPM DeLo Oil
UNITS	Cat. D 13000 diesels
SERVICE	Mine generators and compressors
CONDITIONS	Continuous operation
FIRM	Bradley Mining Co., Patterson, Idaho

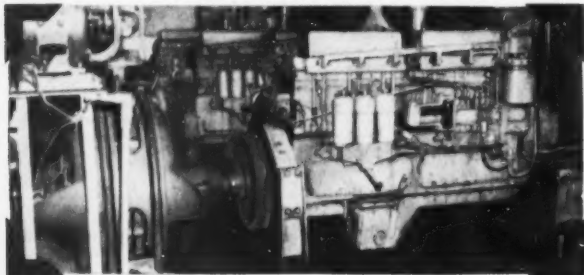
Time between overhauls increased 100% to 150%



15,965 HOURS OF OPERATION SINCE LAST OVERHAULED, and still working efficiently on Standard Diesel Fuel and RPM DELO Heavy Duty Lubricating Oil, is the record this engine had piled up when these pictures were taken. It is one of ten D13000 diesels at the Ima tungsten mine



in Idaho. Before switching to Standard Diesel Fuel, fouled and worn parts made it necessary to pull these engines down after about 5000 hours. Now they usually go at least 10,000 hours before overhauling, says Mr. C. C. Hathorn, Mine Manager.



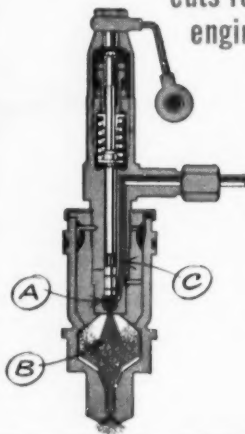
MINE AND CONCENTRATOR LOADS, generators and compressors are operated by Ima Mine's diesels. In six years of operation of the 10 engines on Standard Diesel Fuel only one fuel pump has been replaced; an average of only 12 injectors per year required servicing.



TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

REMARKS: Standard Diesel Fuel and RPM DELO Oil work together to develop the highest efficiency in diesel engines. The fuel is made to exact specification; the oil contains compounds to keep engines clean and prevent wear.

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STANDARD OIL COMPANY OF CALIFORNIA

precipitates—CENTRAL and EASTERN

Pickands Mather to Mine Fortune Lake Property

Stripping will start around July 1 at the Fortune Lake property acquired by Pickands Mather & Company near Iron River and Crystal Falls, Michigan. The company has acquired five forty-acre tracts and expects to develop an open pit operation on the site of the old Fortune Lake mine.

Oglebay Norton & Company originally developed the property. The mine was abandoned in 1920 after a 275-foot shaft had been sunk. This shaft will be repaired and dewatered, and a crosscut will be driven under the proposed pit area to drain the orebody. Deep well pumps will pump the water to the surface. About 30 men are already at work building roads, diverting Briar Hill Creek, and repairing the shaft. About 75 to 90 feet of overburden will be stripped.

Pickands Mather expects to mine by open pit methods, and there are no plans at present for underground mining when the pit ore is exhausted.

Two Firms Plan Taconite Concentrate Pilot Mill

A \$75,000 pilot plant for pelletizing and heat hardening taconite concentrates is being built at Carrollville, Wisconsin, 14 miles south of Milwaukee. It is expected to process one to two tons per hour of concentrated taconite fines brought in by rail from the Mesabi Range. The plant is a joint undertaking of Allis-Chalmers Manufacturing Company of Milwaukee and the Arthur G. McKee Company of Cleveland.

Pelletizing will be done in a balling drum and the "green" (soft) pellets dried in a rotating drum prior to being fed to the traveling grate. During the travel on the grate, the green pellets will be further dried, preheated, ignited, and burned. Waste heat from the grate is utilized in the drying and preheating stages to reduce fuel consumption.

The pilot plant will also permit further study of such problems as heat hardening of both magnetite and hematite concentrates without admixed carbon.

It is planned to ship the product from the unit to a blast furnace for test in actual iron production.

To Recover Staurolite From Florida Beach Sands

The Humphreys Gold Corporation's mine six miles east of Starke, Florida, is installing equipment to recover staurolite as a byproduct from beach sands. Production is expected to start in June. The mine is operated by E. I. du Pont de Nemours & Company.

A recovery unit is being installed inside the mill which is presently used to recover ilmenite. About 25,000 tons yearly of staurolite is expected to be recovered from the ilmenite mill's tailings.

Staurolite is an iron-aluminum silicate. It will be used as a source of aluminum in the manufacture of Portland cement at the new Lehigh cement plant at Flagler Beach, Florida. It will replace the aluminum formerly provided in clay shipped from Georgia.



White Pine Copper Company has awarded a contract for development of its properties in Ontonagon County, Michigan to Turner Construction Company. Estimated cost of the project is \$57,185,000. Work has begun and completion is expected within three years. Included in the contract with Turner is underground development of the mine and belt tunnels, a mill to process 10,500 tons of ore per day, a smelter, power plant, appurtenance works, and a townsite to accommodate 3,000 people. The project will have an annual production of about 75,000,000 pounds of copper. Mining will be by conventional room and pillar method, and ore will be brought to the surface by belt conveyors. White Pine, a subsidiary of Copper Range Company of Boston, also awarded design contracts to Stone & Webster Engineering Corporation of Boston for the power plant; Western-Knapp Engineering Company of Hibbing for the mining, milling, smelting, and appurtenance works; and Pace Associates of Chicago for the townsite and facilities.

Calumet & Hecla Consolidated Copper Company reports that applications are on file with the Defense Materials Procurement Agency seeking government financing of the unwatering and rehabilitation of the company's copper mines that were shut down in the 1930's. If the projects were approved, they would make available 40,000,000 to 50,000,000 pounds of copper per year over a period of about 15 years. Exploration contracts have been made with the government to explore for copper ore in Northern Michigan and for zinc-lead ore in the Wisconsin-Illinois district. If ore is found, repayment of the government's share will be on a royalty basis. A substantial tonnage of ore has been found in Wisconsin, while in northern Michigan results are encouraging but it must still be determined whether the bodies are of ore grade.

The Defense Materials Procurement Agency has signed a two-year contract with the Copper Range Company of Boston. The DMPA will buy up to 6,372,000 pounds of copper at 33.8 cents a pound for the ore produced by the company at its high-cost Champion mine in Houghton County, Michigan. The ceiling price on Lake Copper is currently 24¢ cents per pound. The contract expires December 31, 1953, and may also be cancelled by either party with 60 days notice. It will cease automatically in the event that copper is removed from price controls.



Soil Builders Inc. of Dunellon, Florida, and the Kellogg Company of Ocala, Florida, offered a high bid of \$14,994 for 90 acres of phosphate land, offered for lease by the Bureau of Land Management. The land is located about three miles north of Inverness in Citrus County, Florida. Howard Fertilizer Company of Orlando was high bidder with an offer of \$510 for a 20-acre tract about eight miles northeast of Brooksville.

New facilities to produce about 6,000 tons of electrolytic manganese annually are planned by the Electro Metallurgical Company at its Marietta, Ohio plant. The company, a division of Union Carbide and Carbon Corporation, has added electrolytic manganese to the list of products made at Marietta because of the growing demand for manganese of extreme purity. Metal produced by the electrolytic process is the highest purity commercially available. A sixth large electrolytic furnace has been put into operation at Marietta and eight more are under construction.

Glidden Company and Bohn Aluminum & Brass Corporation have agreed to pool research facilities in an attempt to develop methods for producing pure titanium metal its compounds and alloys, and for fabrication of ductile titanium and its alloys. Both companies have been working on these projects independently. The new program will be a 50-50 arrangement covering both cost and exchange of information. It has been hinted that a new corporation might eventually be formed to take over this development work for the two companies. Research will be conducted at the Glidden laboratory in Baltimore and at the Bohn laboratory in Detroit.

A special course in Surface Reactions in Flotation will be given at the Massachusetts Institute of Technology from June 9 to 13. Topics will include absorption as a thermodynamic process, the electrical double layer, the effect of crystal structure on the nature of solid surfaces, classification of minerals by flotability, properties of common collectors in aqueous solutions, applications of the ion exchange process, and the pH variable. Further information may be obtained from Dr. Ernest H. Huntress, director of the summer session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39, Massachusetts.

Reynolds Metals Company of Richmond, Virginia, has ordered more than \$5,000,000 worth of equipment from Westinghouse Electric Corporation to be installed in a new Reynolds aluminum reduction plant near Arkadelphia, Arkansas. The new plant will cost approximately \$30,000,000 and will have a yearly capacity of 110,000,000 pounds of aluminum pig.



Certificates of necessity for accelerated tax amortization have been granted by the Defense Production Authority to the following companies: *Balkan Mining Company*, Bovey, Minnesota, applied for and was eligible for \$534,950, with 65 percent certification, to increase production of iron ore and concentrates; *Bennett Mining Company*, Keewatin, Minnesota, eligible for \$481,465, 60 percent certified, to increase production of iron ore and concentrates; *Duluth, Missabe & Iron Range Railway Company*, Duluth and Two Harbors, Minnesota, \$417,881 of \$432,542 applied for, with 50 percent certified, to improve iron ore transportation; *Lake Mining Company*, Biwabik, Minnesota, \$653,625 applied for and eligible for, with 65 percent certified, to increase iron ore production.

The *M. A. Hanna Company* has asked for bids for the construction of an engine house for its new *Cannon* mine at Stambaugh, Michigan, on the Menominee Range. The shaft is now down to the ledge where the company will take over its sinking from the contractors who did the work through the surface. It will add materially to production from the Menominee Range. At the *South Agnew* mine in Minnesota, stripping of the Agnew No. 2 has been carried on with a 7½-yard shovel, while another shovel was removing lean ore and rock to lower the skip pocket. Stripping was used to make

a new tailings dam. At the *Morton*, the 1150B dragline has dug a drainage ditch around the crest of the pit and a 7½-yard shovel has been loading surface stripping. Here, too, the dirt has been used for building a tailing basin. Other Hanna properties at which stripping was carried on during the winter are the *Weggum*; *Section 18*; *Carlz*; *Perry*; *Mississippi group*; *Kevin*; *Olson*; and *Duncan*, where the stripping program connected the Duncan with the *Douglas* pit and allowed Douglas ore to be hauled out through the Duncan pit. Hanna's sintering plant at the *Portsmouth* mine has undergone winter repairs and is ready to start its 28th season.

The *E. W. Coons Company* has completed a stripping program at the *Sparta* mine, east of Eveleth, Minnesota. The *Duluth, Missabe & Iron Range Railroad* is building a siding into the company's *Sidney* mine which was stripped last year. The *Sidney* will ship ore in 1952. A small tonnage was shipped from the mine in 1941. The Coons company has also completed some additional development work at its *Julia* pit near Virginia, Minnesota, in preparation for the coming ore season.

Zontelli Brothers Inc. is installing one new 60-inch Simplex Wemco classifier in the washing circuit at its *Virginia* mine, Ironton, Minnesota, and a similar unit in its washing circuit at its Ironwood, Michigan heavy-media plant. Ore is mined from open pit at the Virginia mine and from waste piles at the Ironwood operation.

Five subcommittees of the Minnesota state legislature have been appointed to make studies on various phases of the iron

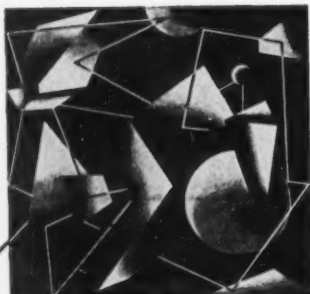
ore industry as it affects Minnesota. The committees are to report on the quality and extent of Minnesota iron ore reserves and competitive reserves elsewhere; the cost of mining and developing Minnesota iron ores and competitive ores in other parts of the world; the advisability of using the Lake Erie price as a tax base and to obtain other pertinent tax data; to study the impact of national defense; and to study the possible effect of the proposed St. Lawrence waterway on Minnesota's iron mining industry. A fund of \$150,000 was allotted for these studies.

Topographic maps covering the Mesabi Range in the Aurora, Embarrass, Biwabik, and McKinley areas of Minnesota are now available for distribution. The maps show all natural surface features, such as rivers, lakes, swamps, hills, and depressions, as well as railroads, highways, and towns. They may be obtained from the United States Geological Survey, Washington 25, D. C. at twenty cents each. Maps are currently being drafted for the area extending from Eveleth and Virginia to Chisholm and Hibbing.

The *United States Steel Corporation's* three new ore carriers, constructed for 1952 service, have been christened and launched. The three ships, all of the same size, have a capacity of 19,720 tons each, and a loaded speed of 16.25 miles per hour. Each contains 6,150 tons of steel, exclusive of fittings, machinery, and superstructure. The three new vessels add 2,200,000 tons to the corporation's annual ore-carrying capacity which, in 1951, was in excess of 26,000,000 tons. All three were named for directors of U. S. Steel—Arthur M. Anderson, Cason J. Callaway, and Philip R. Clarke.

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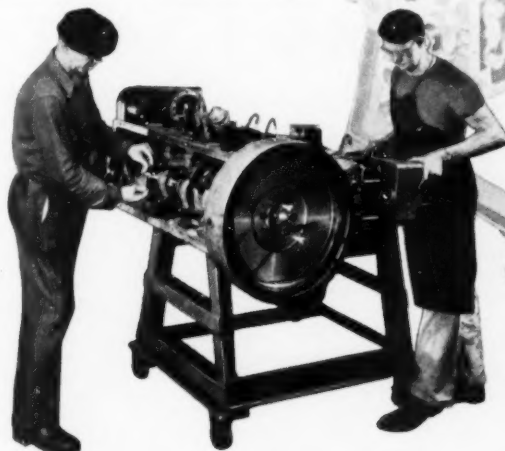
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Sullivan Driving New Mill-Level Haulage Adit

The Sullivan Mining Company has started driving an 8,500-foot, mill-level, haulage adit to the main shaft of its Star mine from the Hecla Mining Company's surface plant at Burke, Idaho. The adit will replace the present 9,000-foot haulage tunnel from the 2,000-foot level of the Hecla shaft which connects with the 4,000 level of the Star mine.

Under present arrangements, ore taken from the upper workings of the Star mine must be lowered to the 4,000 level, transferred to ore cars, hauled nearly two miles to the Hecla shaft, and then hoisted to the surface. Officials say that the new adit will reduce mining costs by eliminating this extra ore handling and hoisting, and also will permit mining of ore which is submarginal with existing facilities.

Three crews will advance the 11 by 10-foot heading by working 24 hours a day, seven days a week, in an effort to complete it by the end of the year. Primary and secondary crushing equipment will be installed underground at the 2,000-level intersection of adit and shaft.

Iroquois Mine Drills Property for Zinc-Lead

Diamond drilling at the Iroquois mine operated by Mines Management, Inc. in Stevens County, Washington, has disclosed zinc-lead ore in 23 of 29 holes. The program is being conducted under a DMEA exploration contract. Indicated ore now totals 500,000 tons and inferred ore 600,000 tons, averaging about 4½ percent combined metals. A design and flow sheet have been prepared for a 500-ton mill, to be built in two 250-ton units.

The company's 50-ton pilot plant at Northport, Washington which was completed and tested late in 1951, is expected to handle ore from the Advance mine at nearly twice its rated capacity.



Idaho Mining Company has resumed work at its Moon Creek property near Kellogg, Idaho, with an improved surface plant which replaced one destroyed by fire a year ago. Equipment includes a larger, three-compartment headframe and a double-compartment bin with air-powered chute gates electrically heated to prevent freezing of muck in cold weather. Mine equipment will be loaded directly onto the cage from a truck operating through a new 10x10-foot adit connecting the shaft with the supply yard. The firm has a \$123,738 DMEA lead-zinc exploration contract. Ben Zimmerman, of Phoenix, Arizona, is president, and Wellman Clark, of Spokane, Washington, secretary.

MAY, 1952

Mineral Mountain Mining and Milling Company has asked stockholders to authorize an increase in capitalization in a move to finance deep development of its property in the silver belt of the Coeur d'Alenes of Idaho. Capitalization would be upped from \$100,000 to \$150,000, divided into 3,000,000 shares of 5-cent par value stock.

A vein carrying promising amounts of gray copper ore was intersected unexpectedly by Federal Mining and Smelting Company in an easterly exploratory crosscut from the 3,650 level of its Morning mine at Mullan, Idaho, according to general manager J. E. Berg of Wallace. The vein was cut several hundred feet west of where the crosscut will leave Federal ground for the purpose of exploring Independence Lead Mines' ground.

Hunter Creek Mining Company has offered shareholders 400,000 shares of stock at 25 cents each to finance proposed exploration of its property from the new 2,000-foot level of the adjoining Lucky Friday mine near Mullan, Idaho. Debenture warrants in the face amount of each purchase, redeemable from first profits, would be given purchasers.

Bunker Hill & Sullivan Mining and Concentrating Company reveals that "important new ore" has been opened on the new No. 25 bottom level of the Bunker Hill mine at Kellogg, Idaho. Development work on the level, 1,200-feet below sea level, during 1951 was described as "very satisfactory." The new No. 3 serv-

ice shaft project is expected to be completed this year. Block-caving operations in 1951 yielded 358,972 tons of ore, compared with 112,445 tons in 1950 and 45,937 tons in 1949. Vacuum de-zincing of the Bunker Hill lead refinery and an automatic baghouse to relieve the present old and over-loaded Cottrell plant will go into operation this year. A proposed plant for recovering sulphur from fumes at the Sullivan electrolytic zinc plant would produce about 250 tons of sulphuric acid daily.

Black Bear Silver-Lead Mines of Wallace, Idaho, has been incorporated at \$300,000. Officers were listed as G. W., G. F. and J. E. Ringel, all of Wallace.

Silver Bowl, Inc., of Kellogg, Idaho has informed stockholders it will acquire a half interest in the recently organized Defense Metals, Inc., an Idaho firm with radioactive mineral holdings in central Idaho. Silver Bowl will provide preliminary examination expenses and exploration costs not covered by an anticipated DMEA loan. There are no shares of Defense Metals for public offering. Members of its engineering staff own interests. They are Frank Eichelberger and Robert H. Svendsen of Spokane, and E. A. Julian and Dr. Robert S. King of San Francisco.

Silver Center Mining Company, a Wallace, Idaho firm organized in 1951, has acquired nearly 3,000 acres of mineral ground on the Idaho-Montana border east of Mullan, Idaho. A company official said the ground borders holdings of Cortez Silver-Lead Company and a group



NINE URANIUM DEPOSITS IN MONTANA

Nine uranium deposits, occurring in an area nine miles square, west of Clancey, Jefferson County, Montana, have been reported by the United States Geological Survey. The properties are held by Buford Miles and Dewey Hinman of Helena, and Wayne Hinman of Clancey, operating as the Wilson Lease. Pictured above is the discovery cut made by these men. The uranium minerals are concentrated in pockets along the silicified fracture zones in quartz monzonite and related rocks of the Boulder batholith. The pockets range from 6 inches to 18 feet in greatest dimension and contain as much as three percent uranium. Pitchblende, torbernite-zeunerite, rutherfordine, and autunite or uranocirite were identified. A sample of radioactive cryptocrystalline silica that contained no visible uranium minerals was found to contain .20 percent uranium when analyzed chemically. The Clancey mining district has a production record of \$3,500,000 in silver, gold, lead, and copper.

of properties *Silver Mountain Lead Mines Company* is attempting to consolidate for deep development. It includes the old *Lewis and Clark* group and the *Mint* group. Dr. F. E. Scott of Wallace is president and Harry F. Magnuson, secretary-treasurer. Bulldozing, surveying,

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geologizing, and mapping are planned for this year.

Mascott Mines, Inc., reports 1951 net smelter returns of \$222,000 after royalty payments to *Pine Creek Lead-Zinc Mining Company*. Production from the *Little Pittsburg* mine on Pine Creek, Idaho totaled 27,829 tons of zinc-lead ore. Current milling rate is 100 tons daily.

Articles of incorporation have been filed in Wesier, Idaho, by the *Snake River Miners and Prospectors Association*, with the following directors: Ben Jackson of Battle Mountain, Nevada; T. C. Butler, Jr., of Boise, Idaho; Charles A. Phillips of Wesier; and Elizabeth Coulter of Wesier.

Members of the Hailey, Idaho, Chamber of Commerce have been named as a committee to cooperate with government officials at a conference scheduled for May 15, where plans for a custom mill will be discussed. Hearings were conducted last October by a congressional committee. As a result of these hearings, Hailey was placed on a preferred list for a mill to serve small operators in the Wood River section of Blaine County, Idaho. Members of the Hailey committee are Jess Lackman, Laurence Heagle, H. K. Putzier, W. H. New, and Frank Jones.

Lateral extension of the orezones first encountered in 1950 were indicated by the diamond drilling carried on last year at the *Vulcan Silver-Lead Corporation* property. The property is actually being developed by the *American Smelting and Refining Company* under a long-term lease which provides for a 50-50 split of the profits after ASARCO has recovered its capital investment. Except for this diamond drilling, underground exploration ceased around January 1951 and work concentration was on increasing shaft capacity. Greater knowledge of the ore deposit is expected by the end of 1952. A program of road building and trenching was conducted on the property of *Vulcan Extension, Inc.*, owned by Callahan Zinc-Lead Company. Consideration is being given to a program of increased exploration of the property.

After being shut down during the winter months, monazite dredging has been resumed in the Cascade Basin, 80 miles north of Boise, Idaho. Three dredges are in operation with 10 to 12 carloads of concentrates being shipped to the separation plant at Boise each week. Baumhoff-Marshall and the Idaho-Canadian dredging companies are using bucket line dredges with a six-cubic-foot capacity. The Warren Dredging Company of Boise is using a four-cubic-foot connected bucket line dredge.

Spokane-Idaho Mining Company has installed a heavy-duty, double-drum, Coeur d'Alene-type hoist which will more than double hoisting capacity at its *Constitution* mine on Pine creek near Kellogg, Idaho, according to J. C. Kieffer, general manager. Production before the installation was 185 tons of zinc-lead ore daily.

Federal Mining and Smelting Company is deepening its *Morning* shaft from the 5,000 to the 5,200-foot level. It is expected that this will make the *Morning* the longest exposed lead ore body in the world. The vertical depth on the vein will be 6,420 feet when the 5,200 level is reached. Elevation will be 1,060 feet below sea level.

In less than two years, *Silver Summit Mining Company* has paid off more than \$1,000,000 borrowed from *Polaris Mining*

Company, a subsidiary of *Hecla Mining Company*, during deep development of its "silver belt" holdings near Osburn, Idaho. About \$150,000 in interest remains to be paid.

United Mercury Mines Company has reopened the *Hermes* quicksilver mine in Valley county, Idaho, and is planning early production. The firm, headed by J. J. Oberbillig of Boise, acquired the *Hermes* group from *Bonanza Mines, Inc.*, of San Francisco. It also owns the *Cinnabar*, *Smoky Ridge*, and *Sun* groups, all adjoining *Bradley Mining Co.'s Yellow Pine* property.

MONTANA

The *Wade-Larson Lease* in the New World mining district of Park County, Montana has been in operation all winter and a considerable tonnage of lead-silver ore has been stockpiled. Shipments to the smelter will begin as soon as roads are open. Throughout the winter, the mine was accessible by snowshoes only.

Lyman Brooks is expected to return to Cooke City, Montana soon to reopen the *Irma Mines* where it is reported that a good tonnage of lead-silver ore has been blocked out.

The *Coronado Copper and Zinc Company* recently completed negotiations for acquisition of several mining properties at Butte, Montana, near Rucker which were last worked in 1896. The agreement involves the *Bluebird*, *Largey Estate*, *Monidah Trust*, and *J. R. MacDonald Company* properties. Negotiations have been under way for nearly two years. Blair W. Stewart, vice president of *Coronado*, and Mostyn Grant, a company engineer, have been in Butte completing preliminary arrangements preparatory to exploration and development. The exploratory program will begin as soon as weather conditions are favorable and will be supervised by Mr. Grant. *Coronado*, a wholly owned subsidiary of *Cyprus Mines Corporation*, has large holdings in the Coeur d'Alene district in Idaho, and Mineral County in Montana.

A radioactive zone 105-feet long and 6 to 12 inches wide was found in a vein of gold-silver ore by government engineers at the *Sylvan* gold mine near Basin, Montana, according to Harve H. Phipps of Spokane, company secretary. The DMEA recently approved a \$22,907 exploration project at the property. Phipps said the project calls for sinking a 5 by 10 foot winze 100 feet from the Louise claim adit level to get below a leached zone, and drifting 100 feet east and west. Work will be under contract to D. A. McNab of Basin. It will include access road repairs, construction of a new compressor house, rehabilitation of other mine buildings, and cleaning out mine workings. A hoisting cable, sinking bucket, pump, rock drill, and other equipment will be purchased.

Peter Antoloni of Butte, Montana, has received a Reconstruction Finance Corporation mine loan for \$42,000 for the reopening of his manganese mine. The loan was made under terms of the Defense Production Act.

Trout Mining Division of American Machine and Metals, Inc., is equipping its Philipsburg, Montana, mill to turn out

a manganese-carbonate concentrate, as well as silver-zinc and silver-lead concentrates. The 100-ton mill is being operated at capacity around-the-clock on ore from the old *Speckled Trout* mine. The *Algonquin* mine is being readied for production.



Chewelah Copper Company has reopened the 4,220-foot main adit at the old *United Copper* mine in Stevens County, Washington and is checking old stopes to determine if more than 128,000 tons of copper-silver ore was left in them as old engineering records indicated. The first two stopes examined contained ore, according to E. P. Maher of Yakima, company president. Work of reopening the mine, closed 30 years ago, was started last September.

The Defense Materials Procurement Agency has agreed to improve mine access roads in the Northport, Washington, district as requested by four mining firms, according to Representative Walt Horan (R.-Wash.). The work should be completed this summer, he said. The petitioning firms were *Goldfield Consolidated Mines Company*, *Mines Management, Inc.*, *Scandia Mining Corporation* and *Pioneer Mining Company*.

The Defense Materials Procurement Agency has agreed to purchase up to 18,500 tons of slab zinc produced by the

American Smelting and Refining Company at its *Van Stone* mine property in Stevens County, Washington, provided the company cannot sell it to any other U. S. buyers at a higher price. DMPA will pay 15¢ cents a pound, f.o.b. East St. Louis. Present ceiling price is 19¢ cents. ASARCO, in turn, is building a \$1,719,000 concentrating facility which is scheduled to go into operation by September. The plant is expected to produce about 1,000 tons of ore per day from which it will make zinc and lead concentrates. The agreement will end three years after the company gets its facilities into operation, or when 18,500 tons of slab zinc have been produced, whichever happens first.

Three Peaks Mining Company of Salt Lake City has added to its Northwest hematite holdings, according to G. R. Shallenberger of Spokane, Northwest representative. Besides the previously reported *Thompson*, *Electric Point* and *Kulzer* iron properties in Stevens County, Washington, the firm has acquired eight properties near Moscow, Idaho, four near Stites, Idaho, and claims on Buckhorn Mountain in Okanogan County, Washington. The company plans to ship 2,025,000 tons of hematite from northwest deposits by Christmas. Japan is the principal market for the iron ore. The firm now is in the market for manganese, manganese iron, copper, scheelite, nickel, and chrome.

Gold Gulch Mining Company is developing a gold ore body intersected recently in the Peshastin vein system in the Blewett mining district of the Cascades, southwest of Wenatchee, Washington, J. D. St. George of Blewett reported. He estimated there are 150 feet

of backs. The same vein system is being developed by the adjoining *Gold Bond Mining Company*.

Kaiser Aluminum & Chemical Corporation is building additional facilities at its Tacoma, Washington, reduction plant which will increase the plant's current output by 33 percent from an annual capacity of 50,000,000 pounds to 66,400,000 pounds per year. This raises the company's primary aluminum production goal beyond the 800,000,000-pound-per-year mark. The government has granted a certificate of necessity for five-year amortization of \$2,850,000 out of the total cost. Construction is scheduled for completion this summer. Additional power will come from the Bonneville Power Administration on an interruptible basis.

Tungsten Mining and Milling Company of Spokane has started rehabilitating underground workings at the old *Germania* mine near Fruitland, Washington in Stevens county, under a \$34,650 DMEA project, according to Paul H. Casey, president and general manager. Work is under contract to Wendell Buoy of Ione, Washington, former mine superintendent for *General Electric Company* which once operated the property. Several previously unexplored veins will be drifted upon. Later a new tunnel will be driven across the ravine from the main adit to explore what is believed to be an extension of the Germania vein. Also scheduled for this spring is installation of a rod grinding mill and flotation equipment under a recently granted \$50,000 RFC production loan, first of its kind in the Northwest. Gravity concentration machinery was installed last year.

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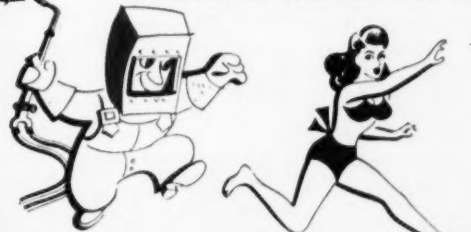
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Minerals Engineering Low Bidder For AEC and USGS

During March, the Minerals Engineering Company of Grand Junction, Colorado, was low bidder on four diamond drilling contracts for the United States Atomic Energy Commission and three for the United States Geological Survey, according to Blair Burwell, company president.

Drilling on two contracts for the AEC started in late April in the Moab district of Grand County, Utah, where each contract calls for between 20,000 and 30,000 feet of drilling. The third AEC contract which is to start about June 1st calls for between 60,000 and 100,000 feet of drilling in the Bull Canyon area of Montrose and San Miguel Counties, Colorado.

The USGS contracts call for 50,000 feet of drilling in the Long Park area of Montrose County, Colorado, which started on April 20th; for 60,000 feet in the Spud Patch, San Miguel County, Colorado, and the Jo Dandy area, Montrose County, Colorado, which started on April 10th; and for 14,000 to 21,000 feet of hole on LaSal Creek, Montrose County, Colorado, and San Juan County, Utah, which started on April 15th. Ray Sullivan, vice president of Minerals Engineering, is in charge of the drilling.

Colorado Standard Opens Remodeled Ute-Ulay Mill

The Colorado Standard Lead-Zinc Mines, Inc. is running its 100-ton-per-day differential flotation mill at capacity. Ore for the mill is mined at the company's Ute and Ulay mine on Henson

Creek, Hinsdale County, Colorado. The firm is a subsidiary of the Lucky Tiger Combination Gold Mining Company of Kansas City, Missouri. Minority ownership is held by several company officials.

The Colorado Standard company has spent the past year in reopening and further developing the mine and rebuilding the mill. A lead-silver concentrate is trucked to the Arkansas Valley lead smelter of the American Smelting and Refining Company and the zinc concentrate is trucked to Montrose for rail shipment to ASARCO's Amarillo, Texas, zinc smelter. Hydroelectric and Diesel electric power is generated at the mine.

William Tobey is manager; H. L. Townsend, assistant manager; and Pierce Walker, mill superintendent. They live in Lake City four miles from the mine and mill.

Park Utah Sees East-West Development Promising

Development in the Ontario section of the Park Utah Consolidated Mines Company's Park City, Utah, mines has disclosed several replacement ore bodies between the 1,400 and 1,700 levels, according to Paul H. Hunt, vice president and general manager. Good possibility exists for eastward extension of mineralization along the Hawkeye-McHenry fissure system on the mines lower levels. Also westward along the Ontario fissure is quartzite above the 1500 (drain tunnel) level.

The Company has placed its No. 5 shaft in operation from the 1,500 to 1,835 levels while sinking is being continued through one of the shaft's three compartments.



The Climax Uranium Company is increasing capacity of its Grand Junction, Colorado, uranium-vanadium plant to 200 tons per day. Increased capacity will permit treating lower grade ore. In addition to increasing capacity, a new dust-collecting system is being installed. The company employs 140 men and is the newest Colorado uranium-vanadium mining and milling operator. Vanadium pentoxide is sold under contract and the U. S. Atomic Energy Commission buys the entire output of uranium oxide under contract. Climax Uranium owns and operates its own mines in Colorado, leases in Arizona, and buys a large tonnage of custom ore from independent ore producers in Colorado, Arizona, and Utah. Marvin Kay of Grand Junction is vice president and manager.

The Idarado Mining Company is driving a raise from its Meldrum tunnel in San Miguel County, Colorado to connect with its Black Bear workings developed through the Treasury tunnel which is portaled in Ouray County. When the raise is completed, it will serve as a low-level connection between Telluride (west) and the Treasury Tunnel (east) sections of Idarado's mining operations. The existing connection is through the Black Bear shaft some 1,400 feet above the Meldrum tunnel. William Nelson of Telluride is in charge of the Meldrum and Bobtail tunnel operations for Idarado.

The Colorado Raw Materials office of the United States Atomic Energy Commission has been making a survey of sampling methods and ore-buying procedures at uranium-vanadium mills in Colorado. Studying results of the survey and evaluating sampling methods is underway, according to Frank H. MacPherson, head of the Colorado Raw Materials office at Grand Junction, Colorado.

The Bachelor Corporation has established an office in Placerville, Colorado as headquarters for operations with O. C. Riddle as superintendent. The firm plans to build a concentrating mill.

The W. L. Davenport Company is operating the Wellington mine at Breckenridge, Summit County, Colorado, under lease from the B. and B. Mining Company. W. L. Davenport of Breckenridge is manager and directs an 18 man crew producing about 270 tons per month of lead-silver-zinc-gold ore. A development program of drifting and cross cutting is now under way at the mine.

The Climax Molybdenum Company has announced production from its Climax mine at Climax, Colorado, for 1951 as follows: 22,538,739 pounds of molybdenum contained in concentrate (11,903,043 in 1950; 259,000 pounds of tungsten in concentrate (162,000 in 1950); and also pyrite, tin concentrate, monazite and topaz. The byproduct mill capacity has



ROAD IMPROVEMENTS WILL HELP MINING

Uranium mine access roads of the type shown here in Mesa County, Colorado, are being improved with \$800,000 appropriated by the United States Congress as part of the program to increase domestic uranium mining. Hauling ore over roads of this type costs the miner more than the \$0.06 per ton mile Atomic Energy Commission allowance. Road improvements will mean lower trucking costs and permit the mining of material that is now too low-grade to mine at a profit. The six-wheel-drive International truck shown above is owned and operated by Fincher Brothers, Grand Junction, Colorado, trucking contractor.

been raised from 8,000 to 20,000 tons per day. Improved tungsten recovery methods and larger capacity should result in a substantial increase in production in 1952. Frank Coolbaugh is resident manager at Climax.



During the past year the *Anaconda Copper Mining Company* has done considerable scouting and general reconnaissance investigation in San Juan County, Utah, including Red and White Canyons, for uranium-vanadium ores. Several mining claims have been staked and an application filed with the Utah State Engineer to appropriate year-round water supplies. The water is to be conveyed 30,000 feet from Warm Springs in Sec. 31, T. 35 S., R. 14 E., in pipe lines, ditches, and flumes. Purposes for which the water is to be used, according to the application, are for milling, mining, domestic, fire protection, air conditioning and irrigation. V. D. Perry, chief geologist, Anaconda Copper Mining Company, is in charge of the work, and F. W. Anderson is field geologist. Anderson was formerly in charge of Anaconda's exploration project at the *Smuggler* mine at Aspen, Colorado.

More than 100 miners attended a recent meeting of the *Uranium Ore Producers Association* at Moab, Utah. Speakers included W. E. Haldane, association president; Robert Palmer, executive secretary of the *Colorado Mining Association*; Vance Thornberg, president of the *Thornberg Mining Company*; Jack Jones, geologist for the Grand Junction exploration branch of the AEC; K. V. Turner, association secretary; and Victor G. Pett, Utah state mine inspector.

Five strategic metals are being sought for by joint DMEA-Company exploration contracts in Utah with the government commitments totaling \$1,920,014. Companies having contracts, locations by counties, minerals sought, and total contractual value include: *Chief Consolidated Mining Co.*, Juab and Utah Counties, lead-zinc, \$436,420; *New Park Mining Co.*, Wasatch County, lead-zinc-copper, \$234,395.20; *Combined Metals Reduction Co.*, Tooele County, lead-zinc, \$222,000; *Combined Metals*, Salt Lake County, lead-zinc, \$55,100; *Nalldriver Mining Co.*, Wasatch County, lead-zinc, \$40,000; *Park Utah Consolidated Mines Co.*, Summit and Wasatch Counties, lead-zinc, \$97,266; *Privateer Mining Co.*, Juab County, lead-zinc, \$8,062; *Park Utah Consolidated Mines Co.*, Wasatch County, lead-zinc, \$42,000; *East Utah Mining Co.*, Wasatch County, lead-zinc-copper, \$109,174; *Harrington Mines Co.*, Beaver County, lead-zinc, \$125,240; *Silver King Coalition Mines Co.*, Summit, Wasatch and Salt Lake Counties, lead-zinc, \$321,534; *Bowles-Heflin Mining Co.*, San Juan County, uranium, \$18,944; *Canary Mining Co.*, Daggett County, uranium, \$26,725; Cecil R. Woodman, Tooele County, tungsten, \$12,379; *Excalibur Uranium Corp.*, Emery County, uranium, \$59,293; *Heber Lion Mining Co.*, Wasatch County, copper, \$5,000; *Kentucky-Utah Mining Co.*, Washington County, lead-zinc-copper, \$35,000, and *J. R. Simplot Co.*, Wayne and Garfield Counties, uranium, \$71,489.42.

U.S. METAL & MINERAL MARKETS

METALS

April 20, 1952

COPPER:	Electrolytic. Delivered F.o.b. cars, destination U.S.A.	24.50¢
	Lake. Delivered, destinations U.S.A.	24.625¢
	Foreign Copper. New York	27.50¢
LEAD:	Common Grade. New York	19.00¢
ZINC:	Prime Western. East St. Louis	19.50¢
ALUMINUM:	Primary 30 pound ingots (99% plus). F.o.b. shipping points	19.00¢
ANTIMONY:	Bradley Mining Co.'s Elk Brand 99.5%. F.o.b. Cascade, Idaho	50.00¢
	Lone Star Brand. F.o.b. Laredo, in bulk	50.50¢
BISMUTH:	(In ton lots) price per pound	\$2.25
CADMIUM:	Sticks and bars. 1 to 5 ton lots (Price per pound)	\$2.55
COBALT:	97-99%, keg of 550 pounds (Price per pound)	\$2.40
MAGNESIUM:	Ingots (99.8%). F.o.b. Freeport, Texas	\$24.50
MERCURY:	Flasks. Large lots, New York	\$203.00-\$207.00
NICKEL:	"F" Ingots (5 pounds). F.o.b. refinery, Port Colborne, Ontario	56.50¢
TIN:	Grade A Brands. New York (Price per pound)	121.50¢
TITANIUM:	(98.8%). F.o.b. Beverly, Massachusetts	\$7.00
GOLD:	United States Treasury price	\$35.00 per ounce
SILVER:	Newly mined domestic. United States Treasury price	90 1/2¢ per ounce
	Foreign. Handy & Harman	88.00¢ per ounce
PLATINUM:	\$93.00 per ounce

ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO. F.o.b. mine, Colorado	\$36.00 per unit
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr ₂ O ₃	\$43.00-\$44.00
	African (Transvaal). 48% Cr ₂ O ₃	\$34.00-\$35.00
	Turkish. 48% Cr ₂ O ₃ . 3 to 1 chrome-iron ratio	\$53.00-\$54.00
	U. S. Government ore purchase depot Grants Pass, Oregon. Base price, lumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cr ₂ O ₃ and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr ₂ O ₃ .	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe	\$ 8.30
	Mesabi, Bessemer, 51.5% Fe	\$ 8.45
	Old Range, Non Bessemer	\$ 8.55
	Old Range, Bessemer	\$ 8.70
MANGANESE ORE:	Metallurgical grade. 46 to 48% Mn. Long ton unit	\$1.10 to \$1.18
	Chemical grade. 80% MnO ₂ . Per ton	\$60.00
	Chemical grade, domestic, 70% MnO ₂ , F.o.b. mines	\$45.00
	U. S. Government ore purchase depot Daming, New Mexico. Base price, \$6.10 per long dry ton for 15% ore. Price increasing to \$76.00 for 40% ore. Less \$12.00 per long dry ton for milling. U. S. Government purchase depot Butte, Montana. Base price, \$6.05 per long dry ton for 12% ore. Increasing to \$40.42 for 30% ore. U. S. Government purchase depot Phillipsburg, Montana. Base price, \$6.43 per long dry ton for 15% ore. Increasing to \$34.81 for 30% ore. (Montana ore must contain not less than 90% as carbonate).	
MOLYBDENUM CONCENTRATE:	90% MoS ₂ . F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	\$1.00
TUNGSTEN CONCENTRATE:	60% WO ₃ . Per short ton unit	\$65.00
URANIUM ORE:	Carnotite-Roscoelite. F.o.b. purchase depot plus \$0.06 per ton mile (\$6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico. Base price for 0.10% ore is \$1.50 per pound and up to \$3.50 per pound of contained U ₃ O ₈ plus \$0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of \$0.25 per pound for each in excess of 10 pounds. A \$0.50 per pound development allowance paid on all ores purchases. At shiprock all ores with more than 6% lime are penalized for excess lime content.	
VANADIUM ORE:	Carnotite-Roscoelite. V ₂ O ₅ in ratio of more than 10 parts to 1 part of U ₃ O ₈ are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock.	
NON-METALLIC MINERALS		
BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots	\$12.50
	Oil Well grade. Packed in 100 pound paper bags	\$14.00
FLUORSPAR:	Metallurgical grade. 70% effective CaF ₂ content per short ton F.o.b. Illinois-Kentucky mines	\$43.00
	Acid grade. 97% CaF ₂	\$60.00
PERLITE:	Crude: F.o.b. mine per short ton	\$3.00 to \$5.00
	Plaster grades. Crushed and sized. F.o.b. plants per short ton	\$7.00 to \$9.00
	Concrete grades. Crushed and sized	\$6.00 to \$8.00
SULPHUR:	Long ton, F.o.b. Gulf Coast mines	\$22.00

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

Montana Tungsten

Continued from page 39

pressor house had been completed and 180 feet of double-track had been installed on the south slope of Rock Creek between the compressor level and the exploration (and haulage) adit level. A new Jaeger air compressor was delivering 365 cubic feet per minute of air under a pressure of 80 to 100 pounds per square inch to a storage tank situated at the foot of the inclined track about 60 feet from the compressor. From this tank the air was travelling by flexible hose to a tugger hoist on the compressor level and a drill on the adit level.

This drill was a new Swedish-made Atlas jackleg drill. The drilling of holes for blasting out a working shelf of about 60 to 90 feet in length was in progress. The shelf will connect the exploration (and haulage) adit to the top of the incline track leading directly upward from the compressor level.

The inclined track leading from compressor level to the exploration adit travels a slope whose steepness varies between 40 and 44°. Cars, specially designed for this type of service by the project manager, carry the supplies and workmen between the compressor and adit levels.

Steepness of the Browne's Lake topography exceeds that of any other Beaverhead County area in which a recognized tungsten orebody occurs. American Alloy Metals, Inc., has employed a 1½-ton-capacity "Autocar" for moving supplies from the camp situated at the east end of Browne's Lake to the compressor level on the south side of Rock Creek about two miles west-southwest of the camp.

Sugarloaf Claims

Early in the 1951 season when the Browne's Lake property of Ameri-

can Alloy Metals, Inc., was under examination for a federal loan, the present organization for locating tungsten claims on Lost Creek was formed. The Fleming brothers: George and Robert; Carl Guidici; and Henry Meine, owner of a large cattle ranch a few miles from the Lost Creek drainage basin, staked 29 claims extending from Sugarloaf Mountain southward across Lost Creek to the most westerly Adams Peak.

Operating from a base camp set up by Guidici near the fork of Lost Creek, the partnership removed grass and some alluvial material from the discovery locations of these claims by bulldozing part of the surface covering the Amsden formation.

On August 30, 1951 Blair Burwell, president of the Minerals Engineering Company, Grand Junction, Colorado, leased the Sugarloaf Claims for a period of 10 years with the option of renewal for a second 10-year period. Hiring one of the Flemings as a prospector, he undertook the examination and staking of certain other properties in Beaverhead County. By the end of the 1951 field-season, over 20 wagon-drill holes had been completed to a depth not exceeding 35 feet and approximately 10 additional bulldozer cuts into the Amsden formation to obtain channel samples were made as a basis for an exploration loan application by Minerals Engineering. In March 1952, Burwell purchased the Fleming interests.

Other 1951 Discoveries

Additional discoveries of tungsten south of the Sugarloaf claims were made in 1951. These included the Adams Peak, the Glow Worm, Greenstone, and Silver Bar. The properties lie in consecutive order if one travels southward from the Sugarloaf claims to the Birch Creek

drainage area. During the summer of 1951, a lease was acquired by Carl Martin on the Greenstone mine, a copper property owned by George Farlin and Carl Kennedy. Martin, a well known manganese and phosphate metallurgist of western Montana, subleased the Greenstone to Blair Burwell during the autumn of 1951.

Other tungsten discoveries near Bald Mountain southwest of the above-described line of scheelite-powellite deposits and on Taylor Creek, Beaverhead County, and at Quartz Hill north of the Browne's Lake deposit were made in 1951.

Future Development

The owners of the tungsten properties not already sold or leased will determine whether Beaverhead County creates a precedent in the United States mineral industry or reverts to the type of milling operation illustrated by the uranium-vanadium industry on the Colorado Plateau. If the independent local people explore and develop their own properties by direct application for federal aid, where necessary, rather than permit this federal aid to reach their properties through the agency of noncompetitive mining organizations, they will create from Beaverhead County's rich and varied mineral resources a prosperity and economic independence that will strengthen the western United States and conserve their own economic and political freedom.

Local owners and the competing mining companies will require the assistance of their Congressmen to insure that a government chemical plant, when and if established in western Montana to process the low-grade tungsten ores, operates on a basis of equal consideration to all ore shippers.

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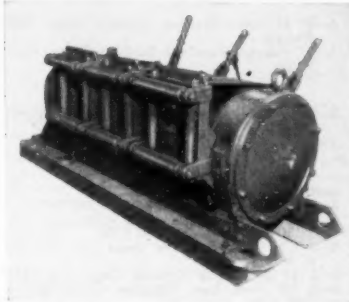
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MINE SUPT. Fgn.	R & B & \$575
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brakes; rope pull 6000# 500 ft. per minute;
fully reversible. First class condition.

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440 v 60 cycle 3 ph.; Cutler Hammer torque
brake; rope pull 8,000#; 500 ft. per minute;
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14-G.E. & Westinghouse electric motors; 3 to
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SEISMO. computer, expd.	\$400
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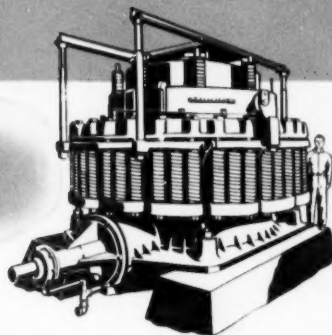
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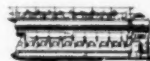
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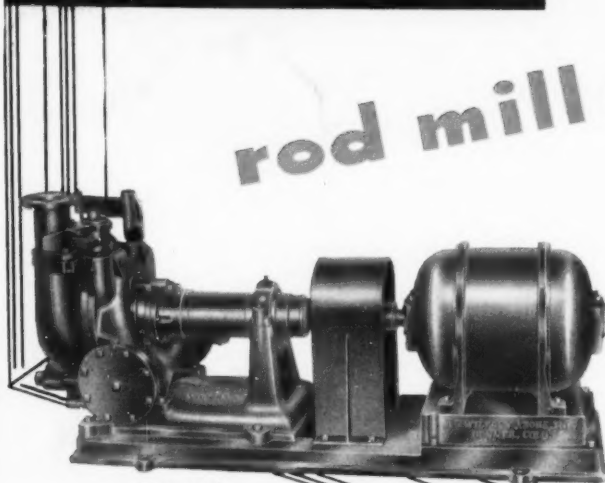


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